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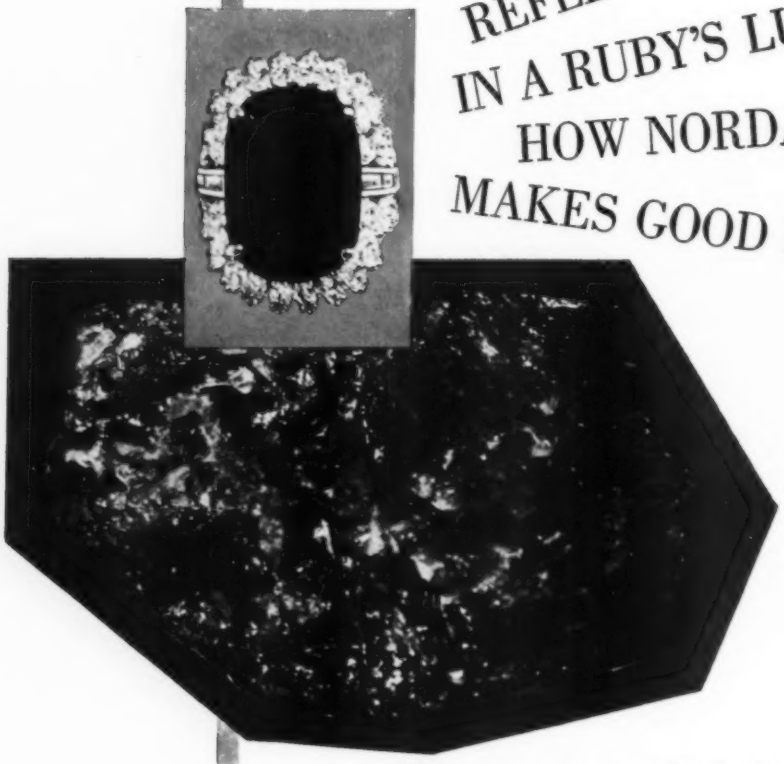

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American Perfumer

VOL. 75, NO. 8 AUGUST, 1960

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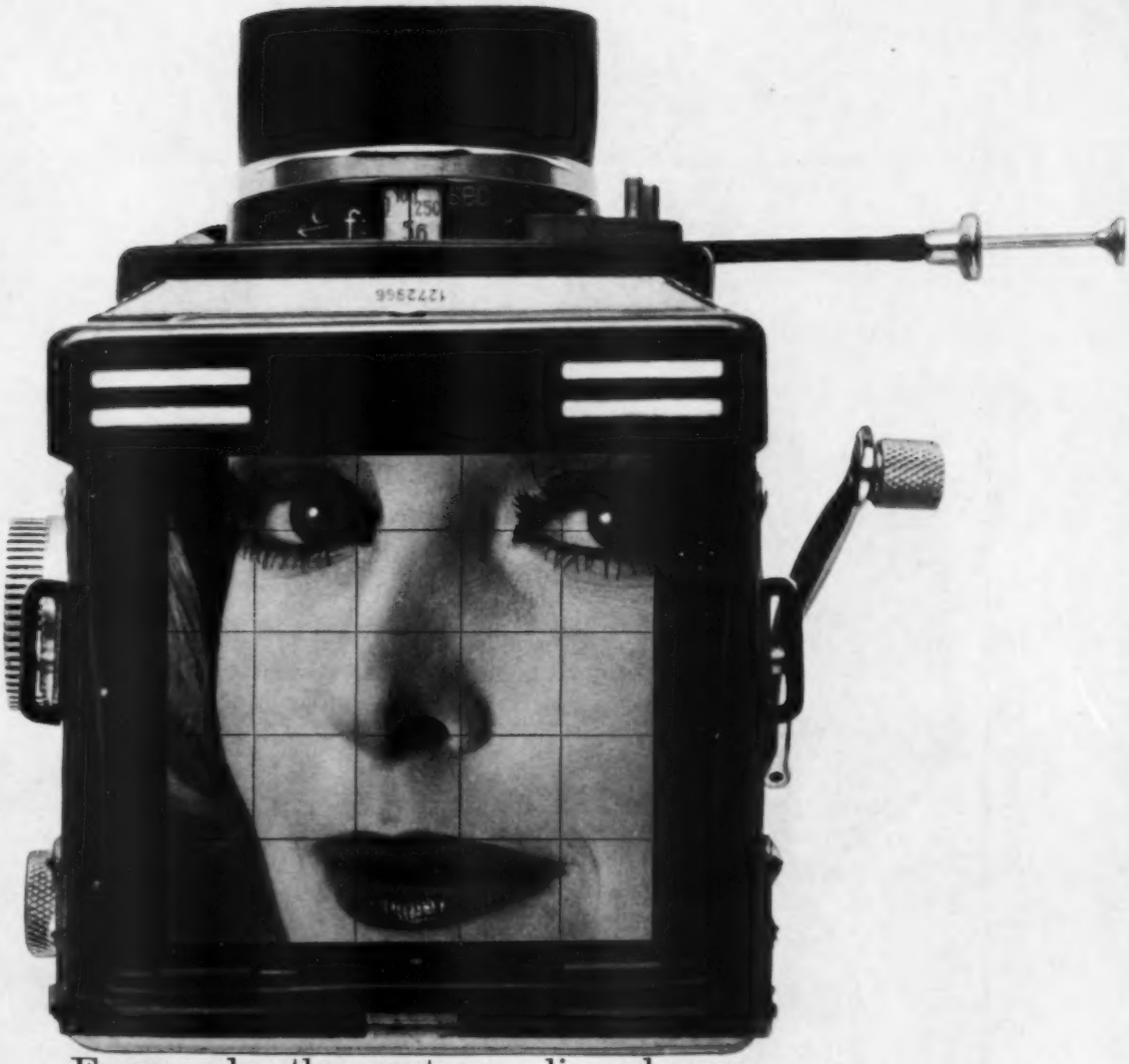

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*Michel Prunieras, LA THERAPEUTIQUE TISSULAIRE EN DERMATOLOGIE, No. 205, July 1949

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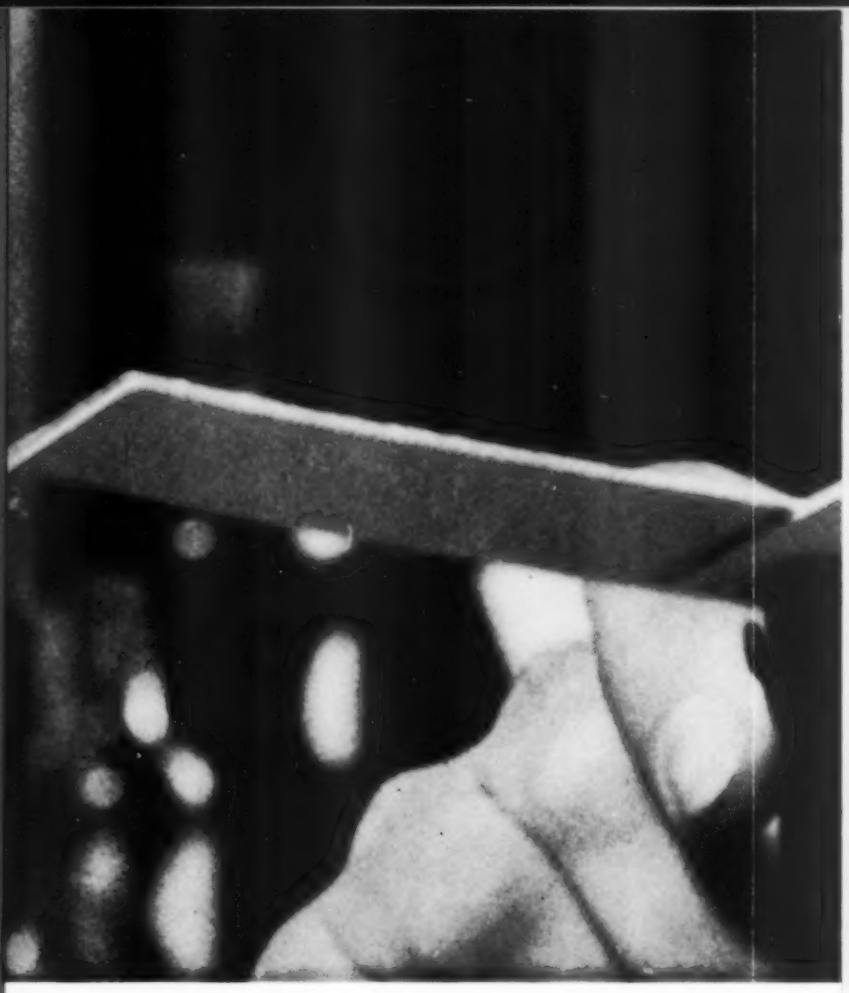

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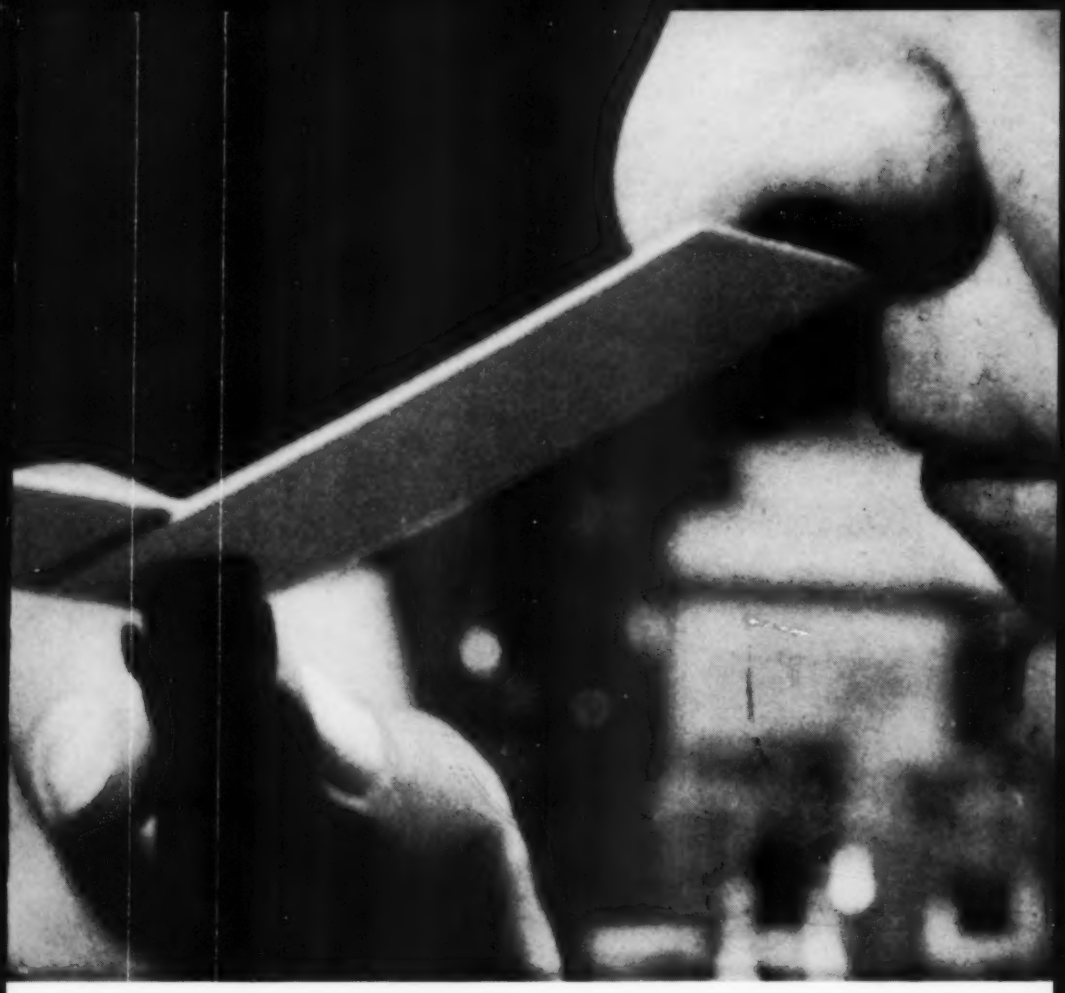

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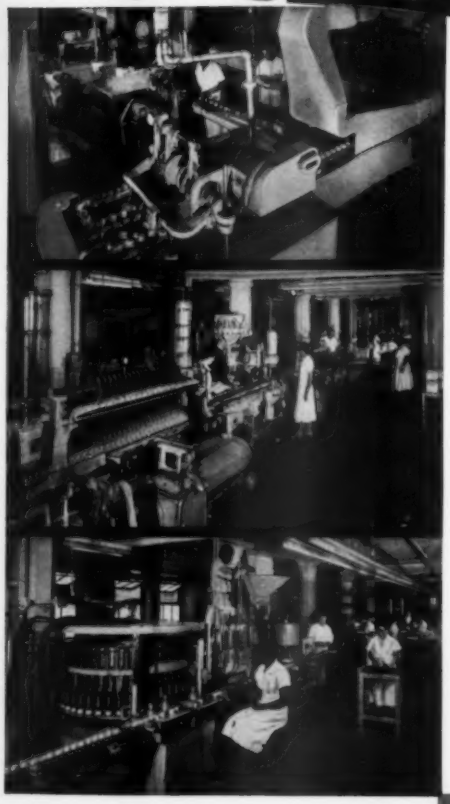

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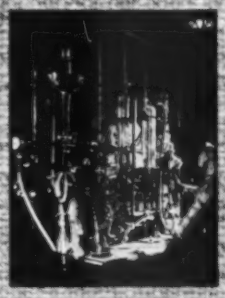

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Questions and Answers

Q. *In a recent issue you stated in "Desiderata" that "an odorless deodorant works by fixation, absorbing odors by a chemical reaction. It can be added to toilet articles or used in food plants, hospitals, warehouses, etc." Can you tell me more about this product and where it can be obtained? This will be greatly appreciated. Your notes are very interesting. It is good to read from someone who knows his chemistry. D. C., Florida.*

A. This odorless deodorant is supplied by National Cylinder Gas Division, Chemetron Corp., 840 Michigan Avenue, N., Chicago, Illinois. We appreciate your kind words of praise.

Q. *We are interested in obtaining a source of silk powder suitable for use in cosmetics. Several companies which we have contacted are no longer in business. J. C., Wisconsin.*

A. You might try the following companies for silk powder suitable for use in cosmetics. Ets. Laserson et Sabetay, 14 rue Jean-Bonal, La Garenne-Colombes, France, Laboratoires Sothys, 20 Avenue Mac-Mahon, Paris XVIIe, France, Laboratoires Prod 'Hyg, 12 rue Pradier, Ville D'Avray (S.-&-O.), France and Dr. Hotz and Company, Vineurl (Oise), France. We also suggest that you write to Louis Schmuck, 34 rue Sadi-Carnot, Puteaux (Seine), France. He is the secretary of the Societe Francaise de Cosmetologie, and will no doubt be able to give you a source of supply.

Q. *We have been very interested by your study on cold wave fixatives in a recent issue. Would you please give us the name of the inventor and of the firm to which he is assignator for Austrian Patent No. 193,079, as well as for the patent which you mention as, "another Austrian patent covers the use of urea along with bromates (Na, Ca or K) in a ratio 1.5 to 1." L. S. M., England.*

A. The name of the inventor for Austrian Patent No. 193,079 is Schwarzkopf. The other patent No. 198,894 is assigned to Sales Affiliates, Inc., New York, New York.

Q. *Please advise the name and address of a manufacturer of a hair color chart with samples of colored hair. C. W., Illinois*

A. There is no stock set of hair colors such as you are requesting. These are made up special and frankly we are not even in position to tell you where to get them. These are all done on a custom basis, and it is our understanding that it is quite expensive. We are further told that the hair color manufacturer usually makes up his own hair swatches and these are then assembled by a printer on lithograph display cards.

Q. *We are seeking information on d-ribonolactone which is a starting material for the manufacture of Riboflavin. We are interested in the company manufacturing it and the selling price and other data that might be of interest to me. H. L., Conn.*

A. We suggest you contact either the Hoffmann-La Roche Co., Nutley, New Jersey, or Merck and Co., Rahway, New Jersey. Both of these companies manufacture Riboflavin. It may be that they can make available to you the intermediate in which you are interested.

Q. *I need to know which brands of perfume on the market contain musk as a predominant ingredient and which brands contain ambergris as a predominant ingredient. J. E., New Jersey*

A. We regret that we cannot help you as this would be an impossible thing for us to do. Some brands may contain both, and we are in no position to identify one over the other.

Q. *We would like to manufacture a product for keeping lips smooth similar to the enclosed sample. We would appreciate your recommendations for formulating such a product. C. N., Mass.*

A. As you know, we are not in position to analyze products. Since the sample you sent is not labelled, we have no way of knowing what it is. It is water soluble so maybe it is one of the polyols suitably colored, perfumed and possibly thinned with water.

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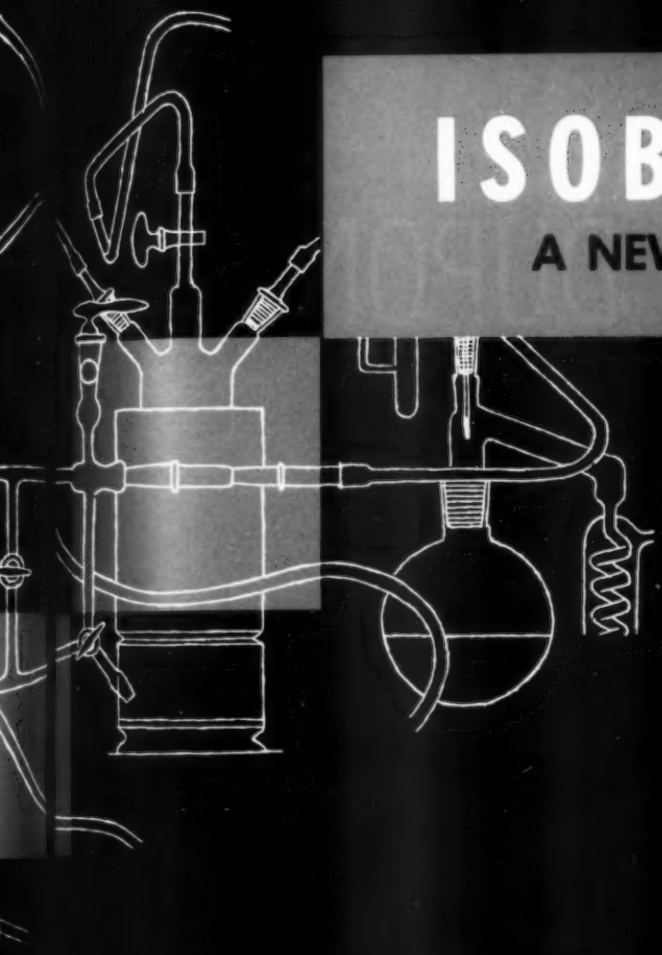

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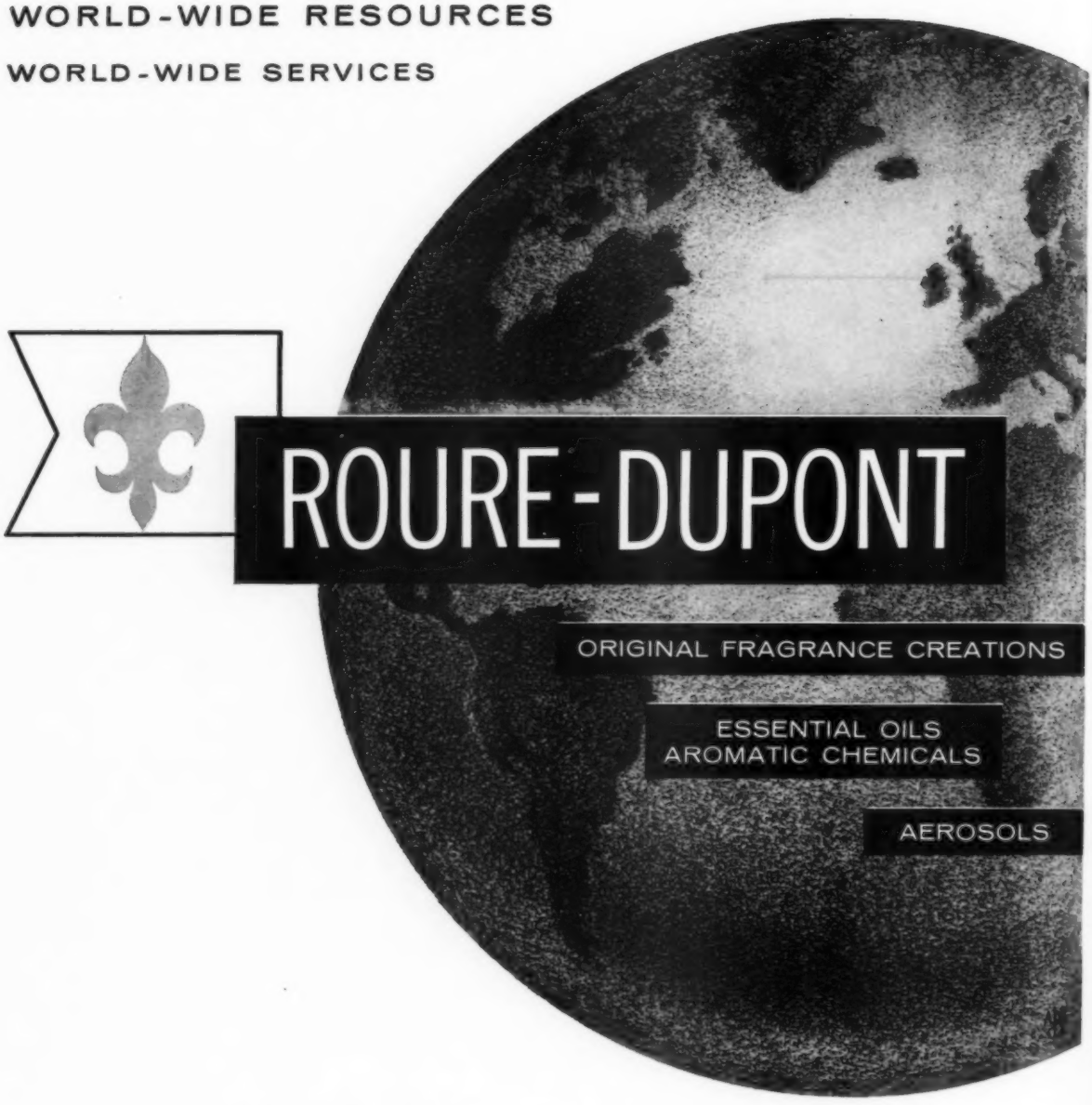

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Notes

The Home Makers Guild of America (Owens Illinois Glass Company) finds that hand lotion is preferred 2 to 1 to hand cream . . . . . The Journal of the American Dental Association, (60, 438, 1960) reports that a mouth wash containing ¼% sodium fluoride reduced dental caries by 80% in children . . . . . Dow Chemical Company has introduced a "Surfaseptic" Polyethylene which is designed to inhibit or kill many types of bacteria contacting the plastic surface." One can see scads of applications for such a material . . . . . An advertisement in one of the Class ladies magazines reads "This treasury of some of the world's costliest ingredients include turtle and shark oils, royal jelly, silicone, Leichol plus 20 additional ingredients never before blended into one jar of cream". Product sells for $20.00 in single ounces or $115.00 per pound jar. "What makes a cream worth $115.-00" is the heading on this advertisement. That is the question I'd like to have answered too, for the copy below it doesn't give the answer to me . . . . . A report by Hodges and Alvarez (JAMA, July 9, p 1081, 1960) again reminds us that the use of antibiotics is not without liability. Another fatal case of puerperal septicemia and endocarditis caused by Pseudomones aeruginosa are described in "The increasing incidence of Pseudomones aeruginosa septicemia, with endocarditis is related to use of antibiotics" . . . . . The same issue of the JAMA (p 1161) carries a letter from Wiseley & Falk calling physicians attention to the carcinogenic nature of B-propiolactone, a recent sterilizing agent for instruments . . . . . Congratulations to Price's (Bromborough) Ltd., on the fine publication of their "Technical Publication No. 6" dealing with the analysis of fats, fatty acids and fatty alcohols. It is literally a text book. The booklet will have a heavy demand . . . . . Elder, Segal, Maxwell & Topper (Science, *132*, 225, 1960) describe some steroid hormone-like effects of menthol in the following words, "Menthol or Menthone, or both, like progesterone, have been shown to have the following biological activities: (i) an inhibitory action on liver and kidney aldehyde dehydrogenase activity which, under certain circumstances, is reflected in an increased rate of oxidation of D-galactose, and (ii) a stimulatory effect on the oxidation of D-galactose by two prepubertal congenitally galactosemic subjects."

Antiseptic Cream For Food Handlers

The current issue of the "Practitioner" mentions an article by Wedderburn in which she suggests an antiseptic cream for use by food handlers which contains 0.5% benzalkonium chloride in an unperfumed nonionic O/W product.

This concentration of the antiseptic is 90% effective against common pathogens found on the hands such as *M. pyogenes var. aureus* in about 30 minutes.

The user must thoroughly rinse hands after soap washing in order that the antiseptic not be inactivated.

Indeed, this writer feels that a companion hand cleanser based on nonionic detergents should be sold to and used by the food handlers.

Over 500 people have used the

cream suggested by Wedderburn with no sensitization but with highly desirable results on bacterial counts on the hands of food handlers.

Eau de Cologne

The 250th anniversary of the creation of a classical fragrance (which unfortunately has lost much of its meaning in North America during the last thirty years) is to be honored by an international symposium to be held in Santa Maria Maggiore, a small Italian village.

Although Giovan Maria Farina (also spelled Jean Marie Farina) is the name most associated with this development, one must also link the name of Gian Paolo Feminis (also known as Paul deFeminis) with it as well. Some say it was first made in Cologne and others say it was Milan. Maybe the symposium will be able to shed light on this.

Probably no one company has done more internationally than "4711" to popularize the fragrance and to keep it alive. It is delightfully refreshing, masculine, feminine and zestful.

Cosmetic Poisoning Accidents

A recent report from the National Clearing House for Control Centers analyzes 11,646 reports of accidental poisoning, gives the breakdown as to causes. In the period 1954-1958, cosmetics accounted for 4.8% of all cases of which 2.0% were treated. Perfumes, hair lotions and deodorants were the most usual toilet articles responsible. This indicates items too often left within easy reach of children.

Furthermore, it points up the fact that it is in this area and others that physicians phoned the "poison control centers" for information because of a lack of knowledge about cosmetic product composition. A program of educating personnel on cosmetic composition in these centers, would be a boon to the industry. Doctors don't always know that there is a TGA and that it can help out. They phone the nearest "center".

FOR THE COSMETICS INDUSTRY

A Selection of Books to Keep You Informed

COSMETICS, by R. G. Harry, is an outstanding book thoroughly describing the physiological effects of every type of cosmetics preparation. A great mass of published literature in the fields of chemistry, dermatology, medicine, microbiology, and cosmetics has been condensed into an ordered and logical science in this comprehensive study.

786 pages, $17.00

FORMULARY OF PERFUMES AND COSMETICS, by R. M. Gattefosse, describes the raw materials, the fundamental classical ideas of perfume blending, and presents typical examples of tested formulations as well as their methods of preparation. This book is a reliable guide for all those engaged in the manufacture or formulation of perfumes and cosmetics products.

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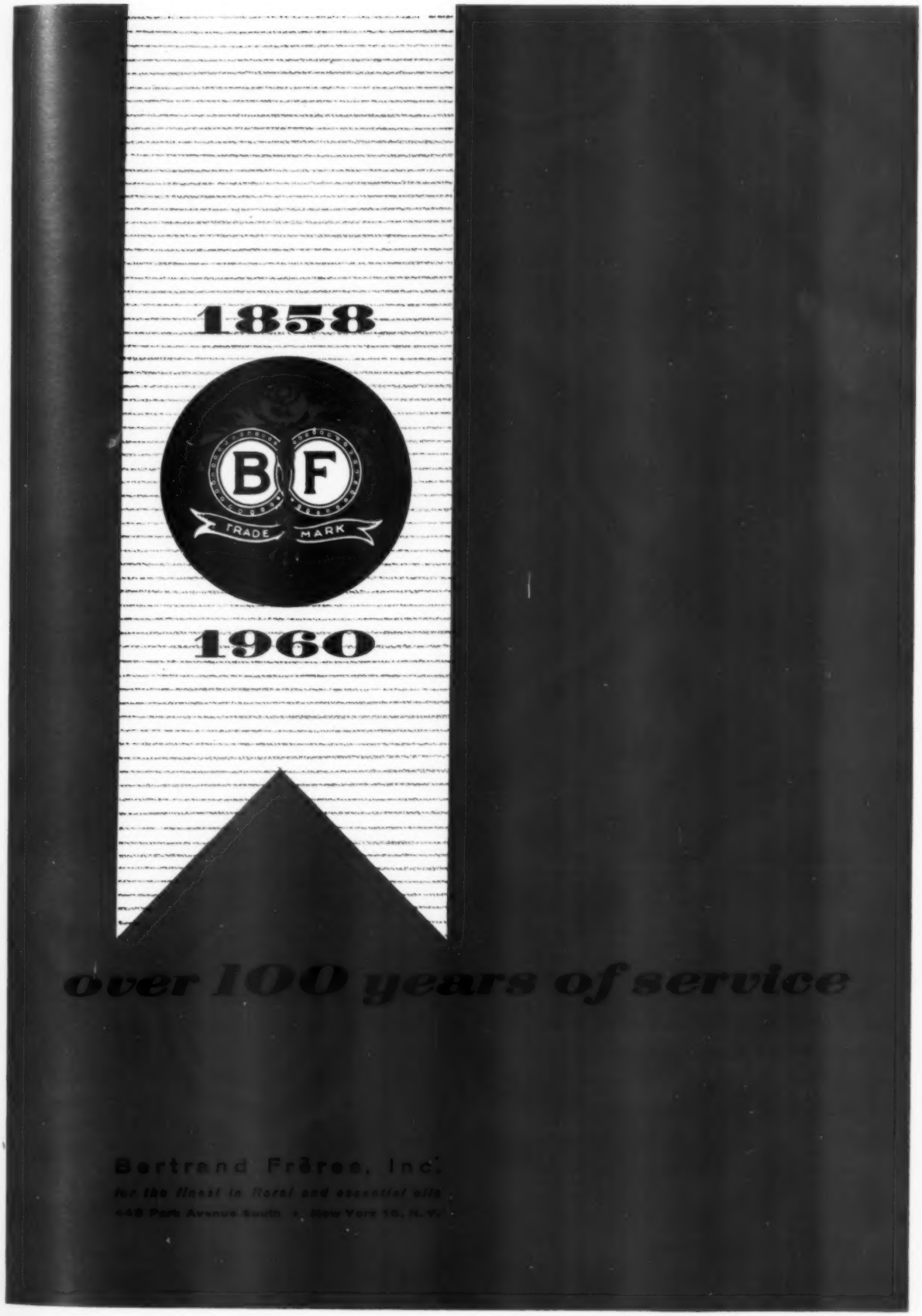
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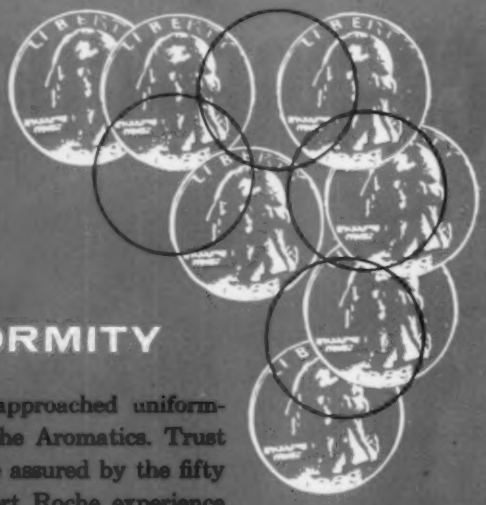

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Pharmaceutics of topical medications

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Local medication is regarded by most prescribers, and especially by dermatologists, as a vital feature in the treatment of skin diseases. But it would be wrong to consider the principles of topical medication in detail, without first seeing it in perspective and recognizing that other measures certainly have a part to play. The physician has to study his patient as a whole, with the possibilities of underlying functional and nutritional disturbances given due consideration. Constitutional factors may well call for therapeutic measures administered systemically; rest and diet may also be important to the patient's recovery. In addition, it is sometimes preferable to administer a drug by the oral route or by injection, to achieve a purely cutaneous effect rather than to use the same drug in a local application, for example, so as to gain a more precise control of dosage.

Having admitted that there is a place for other modes of therapy, it is now possible to examine the aims of topical medication and to see how they may be achieved with the aid of suitable pharmaceutical techniques. There are, indeed, a variety of pharmaceutical forms for local application (lotions, dusting powders, ointments, creams and so on) and each may be formulated in numerous ways. The main point is to ensure that a preparation is formulated to have the optimum pharmacological action to make sure of obtaining the most therapeutic benefit from active constituents that have been prescribed. The elegance of a preparation inspires the patient's confidence and helps to gain co-operation in the completion of a full course of treatment, but its achievement must always remain secondary to the main physiological requirements.

Textbooks of dermatology describe a wide range of skin diseases, many of which are comparatively rare. Obviously some generalizations will have to be made in a consideration of the pharmaceutical aspects of treatment. For this purpose, it will be helpful to consider groupings covering a relatively wide field and to bear in mind throughout that there is one common objective—to bring the patient's skin back to normality.

Skin Flexibility.

The functions of the skin, as a protective mechanical covering for the inner structures and as a barrier against microbial invasion, depend upon its entirety, its freedom from damage or fissuring; it must remain flexible, adjusting itself to postural changes of the internal structures. Maintenance of this skin pliability has been shown to depend on the degree of hydration of its horny outer layer, dehydration causing it to become hard and brittle. There is a permanent reservoir of moisture in the dermis or inner layer of the skin, (which contains some 70% of water); this moisture can permeate outwards to hydrate the horny layer. On the other hand, moisture is contin-

This paper was delivered to the Pharmacy Students Association, The Leicester Colleges of Art and Technology, Leicester, January, 1960.

ually lost by evaporation from the outer surface (especially with exposure to winds or conditions of low atmospheric humidity). In this exchange of moisture between the horny layer and the environment, the latent heat of evaporation creates local cooling which assists in the regulation of body temperature. The aqueous secretion of the sweat-glands has a specially important function in this way, by promoting evaporation at times when the body is inclined to become overheated. Excessive moisture loss by evaporation is normally restricted by the presence of the fatty secretion of the sebaceous glands. These various effects are normally balanced, so that in the equilibrium condition the horny layer holds about 10% of moisture.

Disturbances of the skin often involve faults in the maintenance of a suitable water-balance and the skin becomes dry, fissured and, perhaps, infected. Treatment involves the employment of "artificial" means of restricting evaporation; that is to say the application of unctuous substances. This is the principle of emollient action and it is important to recognize that it is not related to any direct softening effect of oils and fats on the skin.

The formulation of preparations having the correct degree of emolliency is important for achieving a proper state of skin pliability. It is also necessary to avoid going too far in restricting evaporation which would create occlusion or water-logging; this favours bacterial attack and delays healing. Evaporation is restricted most by the hydrocarbon or purely fatty bases, less so by W/O or O/W emulsified creams and by pastes (using the term 'paste' to mean an ointment containing solids such as zinc oxide, which create channelling in the applied film).

Evaporation is purposely encouraged in the treatment of conditions in which water-logging is a pathological feature by using dusting powders; the small solid particles greatly increase the surface-area available for evaporation.

The state of hydration of the horny layer will also be affected locally by the application of aqueous preparations that are definitely hyper- or hypotomic, but the effect is usually short-lived, unless other steps are taken to affect the equilibrium more permanently.

So, it can be seen that the problem of keeping the skin flexible depends primarily on maintaining the moisture content of the horny layer; emollients restore pliability by retarding the evaporation of moisture. Whatever the skin disease concerned, it is always desirable to consider the likely effect of a preparation on the moisture equilibrium; further, the skin will often heal itself without medication if it is suitably guarded from further damage . . . . . an example of this is the use of barrier creams to limit the degreasing effect of household detergents.

Inflammation.

Whilst conservative treatment will sometimes be sufficient, the inflammatory skin disorders often call for a more positive approach. Inflammation is a characteristic of the group of skin conditions that are referred to as eczema-dermatitis. In all these, there is an inflammatory response to some form of stress . . . . . possibly an external, chemical stress that produces an allergic, contact dermatitis or a rather more puzzling eczematous reaction to an endogenous or emotional stress. The tendency to react in such ways as this, may be inhereited, constituting what is known as an "Atopic" eczema.

Perhaps the most significant feature of the inflammatory skin disease in connection with the use of topical applications, is their stage-by-stage progress. Thus, there is the *acute* phase in which the highly-inflamed skin blisters and then weeps profusely. Here it would be quite useless, for example, to apply a greasy and occlusive ointment. Then there is the *chronic* stage where the skin is dry and irritable, demanding the use of antipruritics to relieve itching and also calling for emollients. Between these stages, a *sub-acute* stage may occur, with some degree of weeping and encrustation, along with irritation.

The pharmaceutical approach to these inflammatory states is, first and foremost, to avoid provoking a severe, acute reaction when the natural tendency is for the condition to subside. Applications must be soothing, they must calm down the upset tissues. Thus, cooling and drying lotions (such as Calamine Lotion) are applied to an acute dermatitis; an O/W emulsified cream or a zinc oxide paste will probably suit a sub-acute condition best, whilst a paraffin ointment would be most suitable in the chronic stage. Stiff ointments or pastes, incidentally, have a splinting or immobilizing effect which is itself useful for promoting rest while, at the same time, it restrains the patient from exacerbating the condition by scratching.

In the case of contact dermatitis, soothing or conservative treatment alone may be adequate if the patient can be isolated from the initial source of irritation. But often this is not known or not practical, and indeed, in other forms of eczema, the irritant may be constitutional rather than environmental; it is then necessary to adopt more drastic measures to suppress the inflammation. For example, it may be desirable to use the anti-inflammatory corticosteroid drugs. To avoid the generalized effects of the systemically-administered steroids, it is often preferable to apply them topically; this raises the problem of their transference through the skin, or what is referred to as "skin penetration".

The skin is normally a very effective barrier against penetration by chemical substances. This might be due to the presence of a specially impenetrable tissue-membrane as such or to the physico-chemical properties of several layers of cells which together repel, for example, both anions and cations. The mechanism has not yet been fully clarified but it is well-known that only certain compounds with appreciable lipid and water-solubility can penetrate to any noticeable extent through intact skin; this includes some of the phenols, sterols and alkaloidal bases.

Penetration may be significantly greater in a damaged or diseased skin condition. This may simplify the problem of drug administration on occasion but, of course, it could intensify the risk of adverse side-effects.

Research findings in general support the pharma-

ceutical methods that would be arrived at simply on the basis of common-sense; that is, the compounding of water-soluble drugs in water-miscible bases and oil-soluble drugs in fatty bases. The exact choice of vehicle depends largely on the chemical compatibility of the materials concerned; and the base may often be selected for its physical properties and soothing effect rather than for its problematical influence on skin penetration.

Complications of Inflammation

These considerations apply mainly to the more straightforward inflammatory reactions to irritants—that is, the eczema-dermatitis reactions. The situation may become more complicated, as in seborrhoeic dermatitis, where inflammation arises from follicular blockage by horny material and waxy sebum; common acne exhibits a similar pattern. In these cases, measures are taken to restore patency of the sebaceous ducts and the normal flow of sebum; emulsified creams or lotions are used for softening the crusts in seborrhoeic dermatitis and quite vigorous cleansing by synthetic detergents, deliberately to degrease the skin, may be needed for acne. In each case, salicylic acid will probably be employed to soften the plugs of keratin.

Quite a different reaction to a stress of unknown or, at least, doubtful origin, occurs in the case of Psoriasis. This is manifested by the development of an excessively thick horny layer which is imperfectly keratinized and which breaks up to form detached scales. Various medicaments appear to have some therapeutic value, but a first step is usually to employ a stiff ointment (the vigorous inunction of which helps to dislodge the scales).

Infection.

In this disease, as in the other skin disorders previously mentioned, infection by pathogenic bacteria is not at all an essential precursor. Nevertheless, infection is sometimes a primary causative factor of skin disease as in the case of impetigo, or it may be secondary . . . . . for example, when bacteria are introduced by scratching an irritating skin reaction. In the treatment of skin infections, it is important to deal with the invading organisms without harming the host tissues and to make use of suitable vehicles that facilitate transfer of the active constituent to its site of action. The infection may well occur beneath an intact surface and systemic treatment with antibiotics is then invaluable. If the surface is broken, aqueous lotions or gels and emulsified creams containing the antibiotics or more conventional antiseptics can be employed, which will then diffuse readily into a hydrophilic exudate.

The treatment of superficial fungal infections, such as "athlete's foot" is essentially similar to that of bacterial infections. But it is often necessary to deal with a hyperkeratinized surface in these conditions and a keratolytic, such as salicylic acid, is then employed in conjunction with the specific antifungal medication.

Side-Effects.

It is vital never to forget that there are circumstances in which treatment may do more harm than good. A characteristic feature of the inflammatory skin diseases, is the ease with which the skin will react adversely to provocation. This is not always restricted to the irritant originally responsible for the trouble; local applications may cause a flare-up, either because they contain ingredients which are prone to cause reactions or because the patient is hypersensitive to a constituent which the vast majority of people would tolerate quite safely. It is possible in fact, to distinguish clearly between two kinds of irritant substance, in this way:—

Primary Irritants.

(a) All normal individuals will react.
(b) Reaction usually follows a single exposure to the irritant.
(c) The response is virtually immediate.
(d) Reaction occurs only at the site of application of the irritant.

Sensitizers.

(a) Usually affect only those individuals who are hypersensitive.
(b) There is no reaction to the first encounter with the irritant, but multiple exposures produce a reaction.
(c) Sensitivity does not develop immediately; there is usually an incubation period during which antibodies are being formed.
(d) Reactions of this type may involve areas of the body remote from the site of exposure; a violent reaction may even lead to a fatal exfoliative dermatitis.

The "stinging" sensation produced by some pharmaceutical preparations is a mild form of primary irritation but it is not necessarily serious. Primary irritation is usually an obvious feature if it occurs—a typical example would be that caused by a mineral acid—and steps can be taken to remove the cause. Sensitization is a more subtle problem, less easily recognized; typical secondary reactions may be caused by the antibiotics such as penicillin, local anesthetics such as benzocaine and by the antihistamines and organic mercurial compounds. Skin reactions may follow the ingestion of drugs by mouth as well as by local application. Ointment base constituents are not entirely free from sensitization risks—even in the case of such a universal stand-by as lanolin—but the well-known materials are generally tolerated perfectly well.

We should take care to foresee the less obvious hazards of skin medication; sensitization is a notable risk to which prescribers and pharmacists should be fully alert. But there is also the danger of toxic absorption of medicaments through the skin, especially when it is damaged. Over-enthusiasm in the use of penetrating vehicles could, of course, increase this danger. Mercury and resorcinol are well-known potentially toxic drugs when applied topically, especially in a prolonged course of treatment or on children. A special example of systemic or sometimes localized toxicity, is the cancer-inducing tendency of many chemical compounds. Crude coal tar has been known to exhibit a cumulative carcinogenicity when applied repeatedly as a strong ointment and the risk is probably greater if the base contains surface-active substances.

Practical Considerations.

Let us turn now to the practical application of some of these points in pharmaceutics. It should be clear that the choice of vehicle depends largely upon:–

(1) The effect on evaporation that is required (promotion or suppression).
(2) The desired extent and route of skin penetration.
(3) The release of active constituents to the surrounding tissue or fluids that may be necessary.

Of course, these features are affected by the skin condition of the patient and the active medicaments prescribed. It is the over-riding duty of the pharmacist to compound a soothing preparation, clean, free from grittiness and preferably, without "sting" or other irritant properties. It is, incidentally, usually considered to be preferable to render a preparation as close as possible to the natural skin pH of about 5.5.

The principal aspects of pharmaceutics are, of course, part of every student's training and this includes such essentials as the effective preservation of creams and such like preparations that might suffer mould spoilage. A few points which are less widely appreciated include:–

(a) A drug in solution is likely to exert a greater or speedier action than the same drug in suspension; choice of vehicle will depend upon the desired speed of action.

(b) In a two-phase system, especially on O/W emulsion, the more volatile aqueous phase will evaporate soon after application and any active constituents will be left behind in the oily phase. So, if the aqueous phase comprised 50% of the original composition, the drug potency will be effectively doubled soon after application. This increase should not be ignored.

(c) Drug action in a topical preparation is always rather uncertain, owing to variations in the frequency and quantity of application, extent of inunction, skin temperature and so on. It is certain, however, that a preparation will be useless if any residual medicament rubs off too easily soon after application and the pharmacist can, at least, formulate the preparation to minimize this tendency.

Finally, it is appropriate to add that the pharmacist should help to expedite the patient's recovery with sound advice on the mode of use of medicaments. Except in the treatment of psoriasis, where vigorous inunction may be necessary, most dermatological preparations should only be gently massaged into the skin and then protected with a porous dressing. The pharmacist should perhaps specially warn patients not to make any determined effort to remove one application before applying the next, unless the prescriber has given detailed instructions; misguided efforts by the patient to scrub or scour away ointment residues are said to be one of the most frequent causes of delayed recovery, especially in eczematous conditions.

Containers for dermatological preparations should, I feel, be given more careful consideration than is often done. For example, a fibreboard carton will not only become messy if it is used to hold a soft cream but it will also permit evaporation of the aqueous phase.

Summary.

I should now like to summarize my remarks by listing briefly the main indications for the use of various kinds of dermatological vehicles or bases:–

(1) **Dusting Powders.**
To dry up aqueous exudate and promote evaporation; also to lubricate adjacent surfaces.

(2) **Aqueous Lotions.**
To cool and soothe acute inflammation and to provide cleansing, antiseptic, astringent or antipruritic effect.

(3) **Emulsified Lotions.**
Generally to apply oil-soluble or oil-wettable drugs over a wide area, with some degree of soothing effect from the aqueous phase. The oil phase may be used for protective action or to facilitate penetration of the drug.

(4) **Emulsified Creams.**
Soothing, cooling–if water-miscible, particularly suitable for antiseptics. W/O creams are mainly used when the properties of a greasy base are desired, but without occluding the hair follicles.

(5) **Aqueous Gels.**
Are used just like aqueous lotions, but can be more readily confined to a small area of the skin and maintain contact with the drug over a longer time.

(6) **Anhydrous Water-Miscible Bases.**
Used mainly with oil-soluble or oil-wetted drugs whether intended for superficial or penetrating action, but which would be incompatible with water in an emulsion, on long storage.
These bases are miscible with the serous fluid present when the skin is damaged and are also washable–if the prescriber wishes that the residue should be washed off the skin.
This includes the polyethylene glycol ointments and also the anhydrous emulsifying ointments.

(7) **Pastes.**
Useful where a stiff, protective ointment is needed but when evaporation is still required to proceed unchecked.

(8) **Greasy Ointments.**
Especially useful where evaporation is to be restricted and maximum emolliency produced. Also when friction is a desirable feature of the treatment. Often employed for the barrier effect e.g. against the evaporative action of dry winds. If properly formulated, a greasy base may give excellent skin penetration e.g. of antipruritic drugs.

(9) **Alcoholic Vehicles.**
Can be used temporarily to reduce excessive greasiness of the skin or to apply powerful water-insoluble keratolytic agents. Will sometimes offer good penetrating properties e.g. for fungicidal action.

I hope that what I have said may help you to choose your materials without being unduly influenced by the glossy brochures describing new emulsifying agents and such like, but with the speedy recovery of the skin patient foremost in your mind.

Recent developments in permanent waving

M. M. Rieger
Cosmetics and Toiletries Laboratories
Warner Lambert Research Institute
Morris Plains, New Jersey

The centuries old "art" of beauty culture has undergone a radical transformation during the past 25 years. During this development, an ancient skill became the science of cosmetics. Permanent waving of hair not only changed with the times but was one of the forerunners in scientific progress. Permanent waving modifies physical as well as chemical properties of hair and produces irreversible changes of a part of the human body. It is no surprise, therefore, that dependable commercial waving products require a scientifically sound foundation.

The scientific roots of permanent waving can be found in the work of the textile—especially wool—scientists, of the X-ray physicists, of the biologists, and of the biochemists. Today, as permanent waving comes of age, progress depends more and more on scientists whose primary concern is hair waving.

Even a brief history of permanent waving reveals the important role played by scientific progress in the development of commercially successful waving preparations. It has been well established that the disulfide linkages in hair are of vital importance to either hot or cold waving. That cystine disulfide linkages in keratin connect neighboring polypeptide chains like the rungs of a ladder was postulated by Stary (1).

This thesis proved most fruitful in the hands of Astbury and Speakman, who laid the theoretical basis for the chemistry and the fine structure of animal fibers (2). In 1934, Goddard and Michaelis (3) reported that mercaptans (e.g., thioglycolic acid) in alkaline solutions reduce disulfide linkages in keratin. These and related theoretical discoveries are among the milestones of the development of cold permanent waving (4).

Nevertheless, it was not until the years immediately following World War II that heat waving processes were almost completely replaced by thioglycolate cold waving. Despite reverses and patent litigations (5), thioglycolates have been "hard to beat" as the chemicals for hair curling (6).

General Considerations

Three processes take place during permanent waving of human hair as practiced today: softening, curling or rearranging, and hardening (7). During softening, the hair interacts with the applied chemicals to become pliable and plastic. Softening may be achieved either at or near room temperature (cold waving), at slightly elevated temperatures (tepid waving), or at temperatures exceeding about 65°C. (hot waving). During curling or rearranging, the plastic hair is forced to assume—at least partly—the configuration of the curler. In order to curl the hair, it is generally wound in a circular fashion around a mandrel ("Croquignole" curler) or held circularly by some sort of pin or clip. Finally, during hardening, the initial softening is reversed to restore the hair to its original state. A number of chemical and related processes have been described to effect hardening (neutralizing).

During recent years, the efforts of workers in the

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cold waving field have been directed to the improvement of existing processes. The work includes the determination of the curl strength, i.e., the degree of waving produced by a given process, the study of the safety of the chemicals used for waving, and many other problems. Of most immediate practical importance is, of course, the development of new products. In the paragraphs to follow, an attempt will be made to describe recent activity in the cold wave field.

Thioglycolate Waving Lotions

New developments in thioglycolate waving lotions are rather numerous and confirm the popularity of thioglycolic acid as a waving agent. Although alkaline solutions of thioglycolates containing free ammonia (8, 9) are excellent waving agents, the odor of ammonia is considered objectionable. Complete or partial replacement of ammonia by non-odorous (10) and non-toxic (11) alkanolamines is widely practiced throughout the industry. Brant (10) describes the use of secondary alkanolamines as the so-called "free alkali or alkali reservoir" in waving lotion. Diisopropanolamine appears to be the preferred alkali, and it is claimed that use of this or related secondary amines produces waving lotions causing less skin irritation than if the primary amine is used alone. Brant recommends that the primary amine be used to neutralize the acidity of thioglycolic acid and that diisopropanolamine be used to raise the pH to the conventional range (8.5-10.0). Typical compositions are tabulated below:

Ingredient							
Thioglycolic Acid	0.80	0.65	...	...	...	0.55	0.55
Ammonium Thioglycolate	...	...	0.50	0.45	0.65	...	...
Diisopropanolamine	0.61	0.60	0.55	0.50	0.31	0.65	0.60
Ammonia	0.69	0.63	...	...	...	...	...
Monoethanolamine	...	...	...	...	...	0.50	...
Monoisopropanolamine	...	...	...	...	...	...	0.55

Deadman (12) provides an alternate solution to the odor problem by suggesting that at pH 8.7-9.7 lithium thioglycolate solutions containing some free lithium hydroxide wave hair as well as the conventional preparations.

The possibility of hair damage (13) from cold wave lotions is the continuous concern of cosmetic chemists. Leberl (14) recently discussed the protective effects of colloids such as gums, cellulose derivatives, proteins, polyvinyl alcohol, and polyglycols. He suggests a mechanism wherein these colloids form a protective film on the hair. Leberl also includes silicones in this group of film-formers. A typical formulation containing an alkylpolysiloxane is described in a British patent (15):

Dimethyl Polysiloxane (50 cps)	2 parts
Polyethyleneglycol 400 Monostearate	1.5
Thioglycolic Acid	7.5
Ammonium Hydroxide (S.G. 0.88)	1.7
Perfume and Color	q.s.
Water to make	100 parts

A rather ingenious introduction of silicones into thioglycolate preparations has recently been patented in France (16): The preparation of the various thioglycolic acid esters of monomethyl, dimethyl, or trimethyl silanol is described. Addition of one of these esters to a hydroalcoholic solution of ammonia causes immediate hydrolysis to thioglycolic acid. The simul-

taneously formed silanol polymerizes to a polysiloxane, the latter protecting the hair during waving.

Means to accelerate the cold wave process have been the subject of extensive study. Although the relatively slow acting thioglycolate lotions for home use require only about one hour for completion of a wave—which includes winding and neutralizing—the hair waving industry is continuously trying to shave even a few minutes from the so-called processing time. This is generally achieved by an increase in mercaptan content, in pH, and/or in total alkalinity. Grein (17) has claimed that the inclusion of isopropyl alcohol into waving lotions increases the speed of waving. In connection with Grein's disclosure, it is interesting that Speakman and his co-workers (18) have shown recently that, contrary to expectations, wool is more easily extended in mixtures of water and isopropyl alcohol than in water alone, as long as the concentration of isopropyl alcohol is less than about 75%.

Although solid waving compositions, which are dissolved in water prior to use, have been patented (19), such products have had no wide commercial acceptance to date. In contrast, several years ago so-called waving creams packaged in collapsible tubes were widely promoted for home use in the United States and Great Britain. Creams or gels of this type are claimed to be "dripless" and to impart a desirable feel and luster to the hair (20). A self-neutralizing composition of this type is described in a French patent (21):

Ammonium Thioglycolate	7.0 g
Ammonium Hydroxide, to reach	pH 9.5
Manganese Sulfate	0.05 g
Stearyl Alcohol	15.0 g
Sulfonated Cetyl Alcohol*	5.0 g
Water, to make	100.0 g

*It seems likely that the patent refers to "sulfated" cetyl alcohol.

The inclusion of cationics, castor oil, lanolin, cholesterol, or lecithin for their beneficial effect on hair is further recommended.

Deadman (20) describes a number of polyoxyethylene ethers and esters to prepare creams of this type:

Aqueous Ammonium Thioglycolate (pH 9.2; 15%)	70 pts.
Polyethyleneglycol-400-monostearate	30 pts.

The ingredients are stirred together at 50°-60°C. and cooled to room temperature.

The preparation of a more stable waving cream than the one described above can be achieved by using a combination of non-ionic emulsifiers:

Cetyl-oleyl Alcohol Ether of Polyoxyethylene Glycol (Mole Ratio 1:20)	15-30 g.
Cetyl-oleyl Alcohol Ether of Polyoxyethylene Glycol (Mole Ratio 1:10)	20-40 g.
Stearyl Alcohol	10-20 g.
Perfume	q.s.
Ammonium thioglycolate (50% thioglycolic acid)	100-150 g.
Ammonium Hydroxide (28%)	70-100 g.
Distilled Water, to make	1000 g.

The ethers, the stearyl alcohol, and the perfume are emulsified in about 500 g. of water at 60-70°C. After emulsification and cooling, the ammonia and ammonium thioglycolate are introduced.

A more drastic departure from conventional liquid thioglycolate waving lotions was the development of so-called "impregnated end papers" (22). These papers are prepared by depositing on a porous paper or (non-woven) fabric a solution of an alkali metal salt of thioglycolic acid containing enough non-volatile alkanolamine to raise the pH to about 85.-10.0. Sheets of material are moistened by spraying or dipping to contain approximately 0.1 to 0.2 g. of thioglycolic acid per "end paper" and then dried. In use, wet hair is wound on a conventional curler, using the treated end paper. The wound tress is re-wet with water and allowed to process. Only a few alkalies are useful in preparing non-tacky and stable thioglycolate treated end paper. Moore's examples (22) utilize the sodium or potassium salt of thioglycolic acid together with monoethanolamines or trishydroxymethyl aminomethane. A typical treatment preparation may be formulated as follows:

Potassium Thioglycolate	22.0%
Dipotassium Dithiodiglycolate	10.5%
Trishydroxymethyl Aminomethane	16.5%
Water	51.0%

During the past few months, an aerosol home permanent waving kit appeared on the American market. The waving lotion is dispensed from a pressurized glass bottle as a foam. Although no details concerning the composition of this product are available, it is presumed that a "conventional" waving lotion and propellent system are utilized.

Before discussing the use of waving agents other than thioglycolic acid, a few comments concerning "hidden thioglycolic acid" appear in order. Heilingotter (23) defines as "hidden thioglycolic acid" those compounds that contain chemically bound thioglycolic acid, which is released by decomposition or reaction in the presence of water. Generally these compounds are packaged dry and used after hydrolysis in the presence of alkali. The previously discussed thioglycolic acid esters of methylsilanols (16) belong in this class of compounds. Presumably the xanthates described in the British patent literature (24) are hydrolyzed to yield thioglycolic acid. Reduction rather than hydrolysis is the basis for the effectiveness of the solid odorless compositions patented by Brown (25):

I	
Diammonium Dithiodiglycolate	0.5 M.
Thiourea Dioxide	0.3 M.
Sodium Carbonate	0.7 M.
II	
Diammonium Dithiodiglycolate	0.4 M.
Diammonium Thiomalate	1.0 M.
Sodium Carbonate	0.6 M.

When solid compositions of this type are dissolved in water, an equilibrium between the reducing agent (thiourea dioxide or thiomalate) and the dithiodiglycolate is set up. The resulting thioglycolate is the effective waving agent.

The admixture of a relatively small amount of thioglycolic acid to increase the effectiveness of sulfites has been considered primarily for use in tepid waving composition. Deutsch and his co-workers (26)

combine thioglycolates, substituted amides, and sulfites to achieve rapid waving under tepid waving conditions (15-30 min. at 30°-40°C.). Under cold waving conditions, these preparations require 45-60 minutes for waving. A typical composition follows:

Ammonium Thioglycolate	4.15%
Sodium Metabisulfite	1.5
Urea	6.0
Ammonia (100%)	0.78
Perfume	2.0
Emulsified Mineral Oil	6.0
Water	q.s. 100.0

In order to avoid the need for an external heating device in tepid waving, Boss, *et al.*, (27) propose the use of a mixture of two solutions for permanent waving:

I. Citric Acid	10 g
Ammonium Bisulfite (30%)	60 g
Thioglycolic Acid (80%)	11.4 g
Water	30 g
II. Monoethanolamine	30 g
Water	70 g

When the two solutions are mixed, enough heat of neutralization is liberated to raise the temperature about 20°C. above ambient. The warm mixture is used for hair waving.

Sulfite Cold Waving Lotions

Even though thioglycolic acid is the most widely used reducing agent today, interest in sulfites for permanent waving of hair persists. This is due primarily to the absence of "thio" odor. Unfortunately, alkali sulfites at room temperature wave hair too slowly to be commercially feasible. A number of suggestions have been made to speed up hair waving by sulfites.

In 1957, Mora (28) recommended the inclusion of addition compounds of bisulfite and quinones or polyphenols in bisulfite waving lotions. The resulting products are claimed to be safe, nonodorous, and effective waving preparations at pH's between 6 and 9. The bisulfite addition compounds of hydroquinone, pyrogallol, phloroglucinol, and resorcinol are included in the examples.

Similarly, Watson (29) claims that the addition of a hydroxy aromatic compound accelerates the rate of waving of sulfite cold wave lotions. The following example is typical:

Urea	30 %
Sodium Metabisulfite	7.5%
Gentisic Acid	2 %
Water	61.5%

This composition reportedly waves hair well at 25°C. and damages hair less than regular thioglycolate preparations. In connection with sulfite waving lotions, it is of interest that Whitman and Den Beste (30) patented the use of hexamethylene tetramine to reverse the reaction between bisulfites and hair. It is suggested that hexamethylene tetramine complexes bisulfite and therefore is an effective neutralizer for sulfite waving lotions.

Novel Waving Agents

The never ending search for a "better" safe, odorless and fast waving agent continues.

Diaminomethane disulfinic acid, $(NH_2)_2C(SO_2H)_2$, in the form of its potassium salt reportedly is an efficient, odorless, and safe waving agent (31).

Potassium borohydride, a powerful reducing agent, has been patented as a waving agent (32). Freshly prepared solutions of this substance are claimed to wave hair well; but even such solutions require stabilization against loss of hydrogen. According to the invention, small amounts of boric acid, or glycine, or urea, with or without mannitol, stabilize aqueous potassium borohydride solutions sufficiently to insure satisfactory waving.

Esters of thioglycolic acid (33) have received considerable attention as waving agents in Europe because they are claimed to wave well in the pH range between 4.0 and 7.0. Typical of these esters are the monothioglycolic acid esters of ethylene glycol, 1,3-propylene glycol, glycerol, and of lactic acid. The success of commercial preparations based on one of these or related compounds cannot be assessed at this time.

The safety of thioglycolates for hair waving and hair straightening has been well established throughout the world. However, French legislation prohibits its use in home permanents and places an upper limit on permissible concentrations in professional waving lotions. Morelle (34) suggests thiolactic acid as an acceptable "non-toxic" and "non-caustic" replacement for thioglycolic acid.

Neutralizers

In recent years, efforts in improving neutralizers were directed to increasing their speed, ease of application, and efficacy. Typical of these efforts is the disclosure by McDonough (35) that mixtures of perborates and bromates act synergistically and are exceptionally effective neutralizers. According to Schwarz and Orgel (36), a 0.5% aqueous solution of dehydroascorbic acid oxidizes mercaptan groups in hair no further than to the disulfide stage. It is also suggested that dehydroascorbic acid can be formed *in situ* by the action of oxidizing agents on ascorbic acid. It is presumed that sulfhydryl groups in reduced hair are oxidized by dehydroascorbic acid as well as by the concurrently used oxidizing agent.

Iron salts catalyze the reaction between bromates and sulfhydryl groups in hair, according to an Austrian patent (37). Ammonium salts are included in the disclosed compositions to reduce flammability:

Sodium Bromate	4 %
Lauryl Alcohol Sulfate	1.5%
Diammonium Phosphate	4.0%
Ferric Ammonium Citrate	0.3%
Water, to make	100 %

Even acidified solutions of hemoglobin or hemocyanin have been suggested (38) as useful oxidizing agents for neutralization.

The so-called "instant neutralizers" have achieved wide popularity for both professional and home use. The commercial availability of sodium bromate at reasonable cost permits the preparation of stable concentrated liquid neutralizers. Such preparations neutralize reduced hair rapidly. Generally, 10-15% solutions of sodium bromate are utilized. Numerous hair

conditioners and related materials can be added to impart the desired characteristics.

The addition of urea to bromate neutralizers is suggested in Austrian patent 198,894, (39). Urea reportedly retards combustion, acts as a buffer, and increases the speed of neutralization. Finished neutralizers of this type may be solids, liquids, or creamy emulsions:

Solid:

Urea	150	g.
Sodium Bromate	150	g.
Duponol	9	g.
Ammonium Chloride	12	g.

Liquid:

Urea	150	g.
Sodium Bromate	150	g.
Duponol	30	g.
Ammonium Chloride	40	g.
Water q.s. about	1300	g.

Emulsion:

Atlas G2135	5.5	g.
Cetyl Alcohol	7.0	g.
Lauryl Alcohol	2.0	g.
Water	1000	g.
Urea	172	g.
Sodium Bromate	150	g.

In a related patent (40), the inclusion of sodium nitrite to accelerate the activity of bromates is indicated.

During the past year, neutralizers with lathering qualities have been marketed for home use as "shampoo neutralizers".

Other Problems

Progress in the field of permanent waving has, of course, not been limited to the development of new products.

Unfortunately, the scope of this review permits only casual mention of the histological studies of Mercer (41), the histo-chemical work of Jarrett (42), and the efforts in the field of keratin structure of Fraser and MacRae (43).

Considerable effort has been expended to develop a *reliable* laboratory technique for measuring the curl strength or degree of curl produced by a waving treatment. Kirby (44) recently presented details of a "pegboard" procedure that appears simple enough to prove useful in all laboratories interested in hair waving. A much more elaborate and sensitive technique has been used by Stavrakas (45). He defines the "Curl Strength Index" as the area under the load extension diagram of a curled tress and uses it to evaluate the resistance of curls to deformation.

Haefele (46) recently described the synthesis and physical properties of about 40 different mercaptans. Particular emphasis was placed on the synthesis of derivatives of thioglycolamides (I) and of mercaptoethylamine (II):

$HSCH_2CONR_2$ (I) $\qquad$ $HSCH_2CH_2NR_2$ (II)

The topical toxicity of these and other mercaptans useful for permanent waving has been discussed by Voss (47). On the basis of "repeated insult" patch tests on human subjects, Voss concludes that thioglycolic acid and 3- mercaptopropionic acid are "devoid of significant allergenic activity". This result is rather striking since even cysteine, a constituent of epidermal tissue, elicited a sensitization response in 3 out of 64 subjects.

The recent major advances in permanent waving are the results of well-planned research projects, many of which are still being carried on. It is likely that new advances will be made, further improving permanent waving for the benefit of the consumer.

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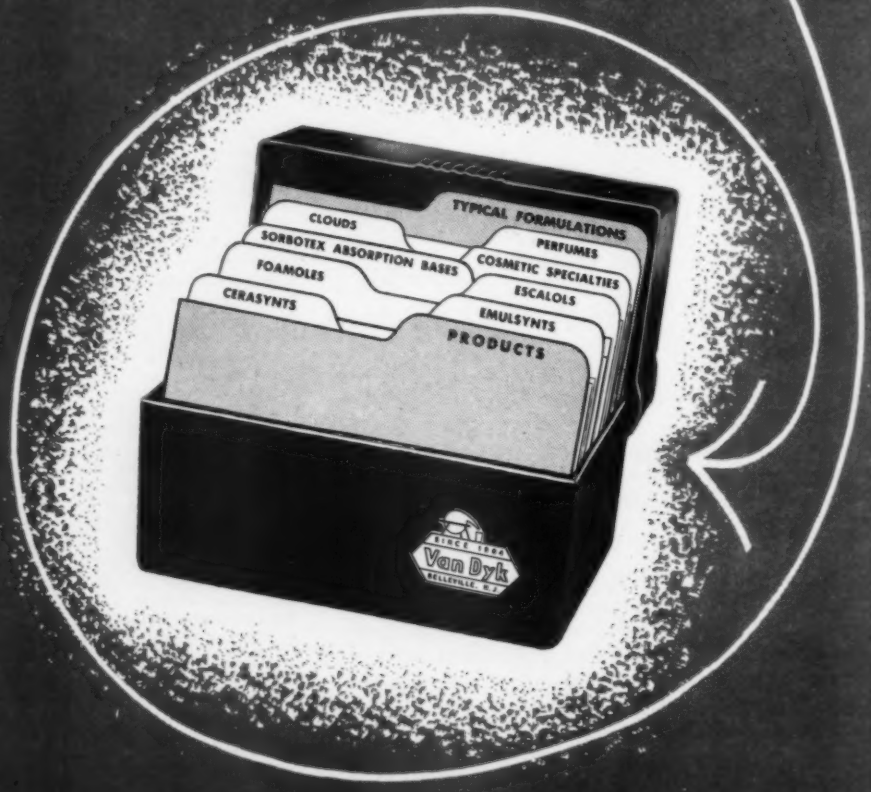

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Tonics in cosmetic products

A review of the botanicals currently coming into cosmetic use in Europe. These include ginseng, St. Johns wort, nettle and dandelion

HANS SCHWARZ

The A and Z in cosmetics is one of good looks. Innumerable preparations are applied each day to create a favorable impression or notice by means of good grooming.

There are first the preparations which are applied externally and which by means of color or treatment give a look of vitality and youth to the skin.

Secondly there are an immense number of preparations which are taken internally to improve the blood supply and circulation in tissues in order to achieve a youthful appearance. This means an internal biological action.

We will now consider this "materia cosmetica."

Tonus Tonika is derived from the Greek tonos and means strain, also sinew and tension or stress. In medicine the term tonus generally is applied to tissues. Since a true tension or stress is found only in the muscle tissue in the body, "tonika" are intended to produce a firming of muscle tissue.

In practical use the term "tonic" has become much more inclusive and has come to mean any invigorating energizing or building up preparation.

There are tonics for internal and external application. No doubt the tonics for internal application will interest the cosmetic industry in a progressively increasing degree; the same is true for the advertising industry.

The most interesting drug which at present is widely advertised as a tonic is the root of ginseng. The well regarded pharmacognocist and pharmacist Hartwich (according to Perrot and Vilmorin in Bull. Soc. pharm. 1904) reports: Ginseng is originally the root of Panax Ginseng, growing wild or in cultivated fields in China and Korea and cultivated in Japan and now also North America (U.S.A.) The root is up to 20 cm long, of a slim carrot shape terminating in a head shaped knoll and divided into different branches which result in a shape reminding one of a human body. It is up to 2.5 cm thick. The root is dry, hard, of yellowish color with cross creases especially in its upper portion. The plants are cultivated with great care; the root is freed from all fibers or filaments, it is scalded and then dried carefully. It is then somewhat transparent. Its structure is in no way remarkable, the rind or bark has a schizogene container for secretions, the starch is jelly-like as a consequence of the scalding.

Ginseng has the reputation of being of value in various types of diseases; it is highly regarded as an aphrodisiac and commands high prices. According to James (1887) only the wild root is valued highly. One ounce (of the wild root) costs 10-20 pounds sterling, whereas a pound of the cultivated root costs only 5-6 shillings. In some respects the position of Ginseng is very much like that of mandragora in the middle ages in Germany. It contains panakolin ($C_{24}H_{23}O_8$) with an unknown chemical structure.

Ginseng is not to be confused with Ninsi or Ninsing root from Siam, Ninsi, sometimes being substituted in China in its place.

At present the root of Panax quinquefolius (as Radix Ginseng Americana) is exported in large quantities into China. It is also in the shape of a carrot up to 10 cm long and 1 cm thick and of yellow grayish color. Its taste is first bitter and then turns sweet. It generally originates in Ohio and West Virginia. In the U.S.A. it is often used in much the same way as licorice is here in Germany. Occasionally this root is used to adulterate radix senegal or radix serpentariae, but it is easily spotted because of its carrot shape. It contains panaquilon, a substance similar to glyzirrhizin, which turns red on contact with sulfuric acid. In the U.S.A. the spherical root of Panax trifolius is called "dwarf ginseng."

In all ages and in all places superstition, the belief in miracles, and advertising ballyhoo are interwoven. It can be assumed that the presently widely advertised ginseng root is of American origin.

A yellow amorphous substance, panaquilon was isolated from the American root 100 years ago. The name is derived from "panacea" (universal healing agent).

At one time there was also a panacea soap for domestic animals, against skin diseases. It contained 88 parts soap, 3.25-nut gall, 2.5-vervain, 3-calamus, 1.25-aloe, 175-fumaria. "If one does not help, perhaps one of the others will and it might be that all of

This article is a liberal translation from the German, appearing in Seifen-Ole-Fette, Wachse 85 No. 6, Page 147, (1959).

them are beneficial, who knows." Thus wrote the famous pharmacologist Hugo Schulz at one time.

It is not the task or function of the cosmetic industry to propagate a mixture of old beliefs in miracles and modern popular assumption; the cosmetic scientists however should know what modern scientific research has to say about the different plants to which an action on the skin has been ascribed. Ripperger calls these plants "dermatotrope antidyscratica" (agents against abnormal or diseased blood conditions).

Dyscrasia means a deviation from the normal composition of the blood.

The medicinal herbs with their content of various types of mineral salts have a stimulating effect on various processes taking place in the blood and they supply cations which are often absent in the customary foods consumed by man, which still too often consist only of proteins, fats and starches.

It is interesting to determine by an example the mineral content of a wild growing plant. The nettle contains 14% ashes (from the dry plant.) As oxides it consists of 32% K, 29% Ca, 5% iron, 8% sulfate, 7% chlorine, 2% sodium, 7% magnesium, 8% phosphate, 4% silicate.

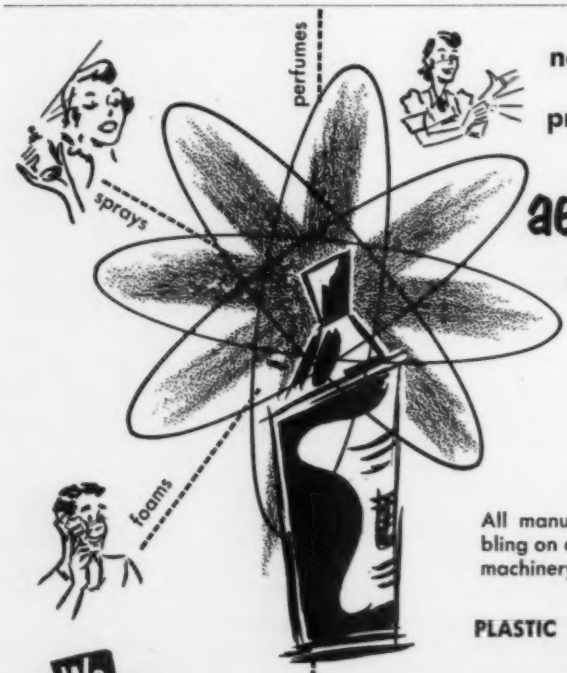
The high content of potassium salts is remarkable in this connection. The two co-workers in the development of the chemistry of colloids, H. Bechold and J. Ziegler explain the beneficial effect of a vegetarian diet in cases of gout and arthritic conditions by the abundant supply of potassium salts which inhibits the deposition of urates (uric acid salts.)

Kesser at the Pharmacologic Institute in Hamburg found that extracts from nettles increase the elimination of uric acid and chlorine. The high content of calcium and iron salts is also of importance. Jaretzky ascribes to the iron salts a favorable influence in the formation of hemoglobin.

There will be quite often smiles when the nettle is proposed as a tonic. However this is not a rare occurrence in connection with medicinal herbs. The well-known Munich clinican Prof. Stepp writes "When at a Congress for internal medicine at Wiesbaden in 1937 mentioned the value of the hagebutte as an inexpensive source of Vitamin C, many of my colleagues were skeptical. However in the years since then its value has generally become well established."

Frequently the complexion is pale and anemic because the mineral salts or the vitamins or in many cases both, are lacking in the diet. Other parts and organs of the body may also suffer damage as is shown by the example of the children of Goms. Goms is a village in Switzerland. Its inhabitants ate a diet which contained very little finely milled flour pastries, sugar and candy. As long as this condition existed tooth cavities were practically unknown. However things changed and numerous tooth cavities were found when a new road was built which allowed the shipping in of the new and highly refined foods which characterizes our present culture.

A tonic well known among folk remedies is the dandelion. It is supposedly effective in chronic eczema. It also was told of its successful use in case of skin blemishes. An analysis of the ashes of dandelion shows the following composition (as oxides): 19.1%



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potassium, 12.19% calcium, 1.35% iron, 2.5% sulfate, 4% chlorine, 33% sodium, 1.4% magnesium, 11.96% phosphate, 12% silicate.

The analysis shows a very high content of sodium salts, which makes the use of dandelion as a spring tonic plausible; the analysis further shows considerable amounts of lime (calcium) and silicic acid. Calcium compounds are considered tonics and important in the formation of the bone structure, silicic acid firms tissues. Gonnermann from the Pharmacological Institute of the University of Rostock thinks it probable that the addition of suitable silicic acid components to the diet will improve nutrition of the skin in humans.

Another crude drug containing silicic acid with a reputed beneficial effect on the skin are the peels of ripe garden beans (Phaseolus Officinale). Like dandelion they are rich in calcium compounds.

However it is not the case that the crude drugs named exhibit a definite and sure effect on the skin. Like with most other drugs or remedies it is rather a question of the individual response in each case.

The names which have been given to certain plants in popular usage (or folk lore) are an indication that certain effects have been observed. In certain sections pansies are called "Girl eyes" in others they are called "Beauty face" and "Pleasant look." The influence of pansies on the skin has been described by Hugo Schulz (in his lectures about the action and application of German medicinal plants.) The effective agents are glycosides and a high content of calcium and magnesium salts. Modern efforts are directed towards the cooperation of dermatologists and cosmetic practitioners. The cosmetic practitioners are in a position to stock and sell medicinal herbs and thus has the possibility to improve and enrich the daily diet. This phase of their activity is considered desirable and is supported by medical specialists.

Gumpert in his book *The Whole Field of Cosmetics* Leip 1931, writes: "It should be pointed out that barbers and beauty parlors could possibly be called upon to fulfill an important social-hygienic task because they really are the day by day practitioners of ordinary body care and because important health promoting functions especially of a preventive nature are their job. They are frequently in a position first to notice the formation of deformities and are being asked for information and advice in this connection."

It is not the job of cosmetic practitioners to propagate the belief in old miracle cures and more modern popular assumptions. However the cosmetic practitioners should have a sound knowledge concerning the findings of modern science in regard to plants and crude drugs which have the reputation of influencing the nature and appearance of the skin. Vegetable juices such as those of carrots, red beets, celery –are some modern tonics founded on vitamin and mineral basis which should also be mentioned.

Cosmetic Tonics

The cells of human body tissues which possess normal healthy pulsating life have a certain tonicity called "turgor." A young girl of blooming look and full of vigor indicates that it possesses the right kind of tonicity.

The process of aging decreases this tonicity more or less rapidly. Then the search for restoratives and tonics begins. How far these are the solution to the problem depends largely on the general condition and constitution of each applicant. The existence of certain skin tonics is undeniable. The most important one is alcohol. Dr. G. Hirth says: "Alcohol is irreplaceable as a stimulant of the activities of nerves and blood vessels and to promote warmth in and underneath the skin. The cells demand more energy without swallowing the poison itself. It is an osmotic effect without any danger." In actual use the application of alcohol is generally in the form of facial (toilet) waters. That a facial water without alcohol is of little or no use as a skin tonic goes without saying. Alcoholic content of higher than 50% generally causes a burning sensation on the skin, for this reason the alcohol content of facial (and skin) tonics is generally restricted to 50%.

Quinine is a well regarded tonic; it is being used in the form of the chloride in skin and hair tonics in amounts up to ½%. One half percent glycerine may also be added.

The ethereal oils have also a tonic effect. They act as irritants which accomplish a better supply and better nutrition of the skin.

It should be noted here that cinchona hair tonics manufactured from cinchona bark are effective as a result of their quinotannic acid content and not on account of quinine content. This latter alkaloid is made ineffective by the presence of tannin.

A very popular facial tonic is camphor. A camphor tonic generally contains .2% camphor, .5% acetic acid; 2.5% glycerine, 50% alcohol (99%) and water q.s.

Camphor milk as an after shaving milk is best made according to the Dehydag recipe with Emulgade F. This recipe also contains witch hazel extract. Witch hazel is a shrub, 1-7 meters high, is found in the forests of the North American Continent and has been used successfully by the native population for many years. As indicated by the name, it is so to speak the American skin tonic. The fresh peels are partly distilled and partly percolated, the two liquids are mixed and the mixture is called hazeline. The extract from bark and leaves should be used cautiously in cosmetics because of its bad odor. The distilled product has a better odor, but even so it is not a perfume. However it does no longer contain the active agent Hamameli Tannin. Hazeline is added to all kinds of cosmetic products.

Another native plant suitable for the manufacture of skin tonics is St. John's wort (Hypericum perforatum). Like the previous plant (Witch hazel) it contains tannin. In addition, ethereal oils and a characteristic dye are present. The latter is partly soluble in fat and partly in alcohol. Since most of the producers of St. John's wort oil do not know this basic fact, they obtain a greenish-brown oil instead of a red one. In an alcoholic skin tonic extract the red dye is masked in the beginning. If exposed to light the red color appears gradually. It therefore should be stored only in dark and amber bottles.

Gessner in his "Poisonous and Medicinal Plants of Central Europe" gives reliable information about the various substances found in these plants.

Sunscreens and their usefulness

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The term "sunlight" includes visible light, ultraviolet and infrared light, with ultraviolet rays being shorter than visible wave lengths and infrared being longer. Almost all of the cutaneous reactions produced by sunlight are caused by ultraviolet, for it is these rays that produce the greatest biologic effect on skin. Surprising as it may seem, most of the effects of sunlight on the skin are harmful instead of beneficial.

To the medical profession sunscreens may be defined as chemicals that protect the skin by absorbing damaging light rays and dissipating their energy in some harmless manner (1). When an organic compound absorbs radiation, it is either raised to a higher energy level or disassociated. An excited molecule may dissipate the absorbed energy by collision, fluorescence, or a reaction with other molecules at collision (2). Because the photochemistry of polyatomic molecules is quite complex, very little is known about the energy conversion processes in ultraviolet absorbers. One possibility is that the absorbed ultraviolet energy raises the molecules to a higher electronic energy level which is quickly converted internally to higher vibrational levels which is dissipated as thermal energy by collisions (3).

A sunscreen can prevent the photochemical degradation caused by sunlight by absorbing ultraviolet wave lengths. Such agents are currently being employed to protect transparent and translucent plastic and in liquids, solutions, paints and varnishes to guard against changes in color, appearance or properties. With the realization of numerous industrial uses for sunscreens, a number of new and very effective sunscreens have been developed, Among the more noteworthy newcomers are the benzophenones (4).

Medical and Cosmetic Uses

Public interest in the effects of sunlight has centered around sunburn, suntan, and the production of vitamin D. Few people, including physicians and nurses, are aware of the role chronic exposure to sunlight plays in aging the skin and in the production of skin cancer. Of considerable interest to physicians, particularly dermatologists, is the fact that some people can become allergic to sunlight and develop eczematous or urticarial rashes on sunlight exposed areas of the skin. Also, there are several systemic diseases, the most significant of which is systemic lupus erythematosus, which are adversely affected by sunlight.

The current changes in our culture are making available more time and money for recreational activity, and people are spending significantly more of this time in activities which by their nature include considerable exposure to sunlight. These recreations include swimming, sunbathing, golf, fishing, picnicking, hiking, boating and numerous other pastimes. The skin of chronically exposed areas can be damaged seriously by large amounts of ultraviolet irradiation from sunlight. The amount of exposure a person receives depends upon a number of factors which include occupation, geographical location, hobbies, recreational patterns, clothing habits, and the individual's attitude toward the sun.

Sunburn and Suntan

Natural protection from sunlight is dependent upon the thickness of the stratum corneum and the amount of pigment in the skin. Following an exposure to sunshine the amount of skin reaction is dependent upon a number of variables, the most significant of which are the duration and intensity of the exposure and the degree of natural protection provided by the epidermis. There are more burn producing wave lengths present in sunlight at midday than early or late in the day, in tropical than northern countries, and at high altitude in contrast to sea level. Snow, sand and water increase the intensity of an exposure as the result of reflection, while smoke, clouds, shade, suntan and clothing provide protection.

Sunburn can be significantly decreased by a tan. The production of a suntan involves three separate

and different processes. A few hours after exposure to sunshine there is oxidation of many melanin pigment granules, and oxidized melanin is darker than reduced melanin. Also following irradiation there is a dispersion of melanin granules and this causes the skin to appear darker. Thirdly, there is production of new melanin; however, this is a delayed effect that is not apparent for several days following irradiation. Light complected and reddish-brown haired individuals are prone to freckling. People who freckle have an unusually large amount of pigment within the melanocytes of a freckle.

Aging and Carcinogenesis

Women should be informed that sunlight accelerates the visible signs of aging of the skin. If you examine an elderly person's skin you will find a striking difference between areas that have been chronically exposed to sunlight and those that are normally protected by clothing. An elderly woman will often manifest conspicuous signs of aging of the face and hands, while the skin of the chest and abdomen usually appear relatively normal. Very old Negroes often present a deceptively youthful appearance, and this can be explained on the basis of the fact that their pigment protects them from sunlight accelerated aging. This also explains why blondes frequently show their age more than brunettes.

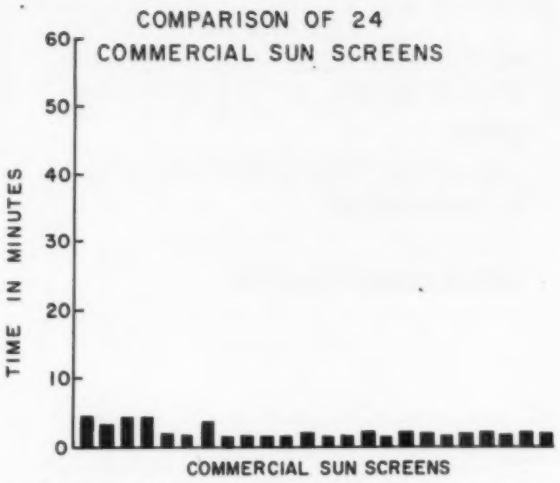
The terms "farmer's skin" and "sailor's skin" have long been employed to describe the weatherbeaten, aged, dry, coarse and leathery skin which often develops in outdoor workers. This type of skin is prone to develop premalignant and malignant skin tumors. Such changes occur in light exposed areas and are the end result of many years or prolonged exposure to sunlight. MacDonald (5) and others have shown that fair skinned individuals who have been exposed to large amounts of sunshine develop more skin cancers than any other group. Negroes are amazingly resistant to the development of skin cancers.

Photosensitivity

Sunlight can and does cause a variety of dermatologic diseases and such eruptions are actually more common than might be expected. It might be worthwhile to mention some of the diseases in which sunlight is a factor. Lupus erythematosus is precipitated or aggravated by sunlight. Xeroderma pigmentosum is a congenital disease in which children develop numerous premalignant and malignant lesions in light exposed areas and seldom live to reach adulthood. The skin lesions of pellagra and porphyria are localized to light exposed areas. A significant number of the commonly used drugs can cause photosensitivity and among the more important examples are sulfonamides, tranquilizers of the phenothiazine type (Thorazine, etc.), the sulfonylurea oral antidiabetic agents (Orinase, etc.), and the new antihypertensive diuretic agents (Diuril, etc.). The most common skin manifestations of photosensitivity are called polymorphic light sensitive eruptons.

Selecting the Sunscreen

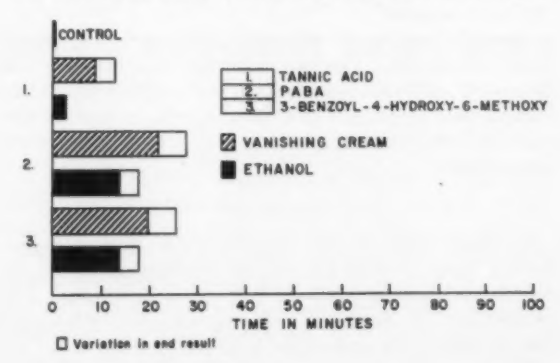
A number of aspects must be considered when one selects a sunscreen for a specific purpose. Of importance are such factors as absorption spectra,

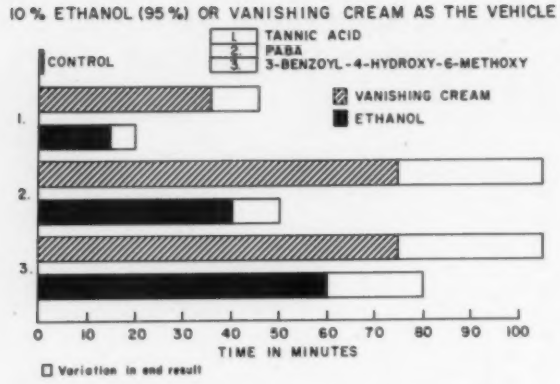


stability, solubility, color, sensitizing index, primary irritant capability and cost. The effectiveness of a sunscreen almost invariably increases with the concentration of the active agent and with the thickness of the applied film.

The first commercial sunscreen appeared in 1928, with the active ingredients being benzyl salicylate and benzyl cinnamate (4). Para-aminobenzoic acid and its derivatives have been the most widely employed sunscreening agents. Rothman has shown that a 15% para-aminobenzoic acid cream can increase the amount of irradiation necessary to produce a threshold erythema by 50 to 100 times (6, 7). In addition to para-aminobenzoic acid derivatives, the families of compounds most commonly used as sunscreening agents are anthranilates, salicylates, cinnamates, pyrrones, benzimidazoles, carbazoles, napholsulfonates, and quinine disulfate (8).

In our laboratory twenty-four commercial sunscreening and suntanning agents were subjected to comparative evaluations with the shaved abdomen of albino rabbits being used to determine the minimal erythema dose (MED). The MED for the unprotected rabbit was found to be 25 to 30 seconds. The best protection provided by any product tested was 3 to 5 minutes, and only 4 of the 24 preparations gave results that were this satisfactory. Five percent concentrations of para-aminobenzoic acid or the benzophenone (2-benzoyl-4-hydroxy-6-methoxy-benzenesulfonic acid) provided protection for 20 to 25 minutes. By doubling





the concentration of these agents, the MED was increased to approximately 100 minutes.

Of importance is the fact that para-aminobenzoic acid and its esters occasionally produce contact epidermal sensitization. In addition these chemicals may produce cross sensitization reactions with benzocaine, the sulfonamides, and the analine dyes (9). Also, Sams (10) found that digalloyl trioleate, a commonly used sunscreening agent, can produce photosensitization.

Only about 2% of the total solar radiation is erythrogenic, and this part of the solar spectrum falls between 2900 and 3200 Angstrom units. The maximal effect of sunburn erythema has been established to 2967 Angstrom units. The erythemal effectiveness at 2925 Angstrom units is 70%, at 2967 Angstrom units it rises to 100%, and at 3132 Angstrom units there is a decrease to 2% (11). When sunlight causes the production of new pigment, the sunburn spectra are involved. However, wave lengths longer than 3200 Angstrom units can produce oxidation of melanin and the dispersion of melanin granules, both of which cause the skin to appear darker.

In addition to chemical sunscreens there are certain agents that act as physical sunscreens. Physical sunscreens are occasionally termed "sun shades" since they are opaque chemicals that scatter light rather than absorb it. Examples are titanium dioxide, talc, kaolin, zinc oxide, and bentonite. These agents are occasionally used in combination with chemical sunscreens. It might be worthwhile to state that a cream vehicle alone will provide some protection, and petrolatum, especially red petrolatum, can provide considerable protection. Fortunately, window glass also prevents sunburn by filtering the erythema producing wave lengths.

Several companies are currently marketing ultraviolet absorbers. A wide selection is available and new and different sunscreens are continually being introduced. It should not be difficult to incorporate an excellent sunscreen in almost any type of cosmetic formulation.

Discussion

To date most of the commercially available sunscreen preparations have been developed in an attempt to prevent sunburn but allow a suntan. The prevention of pigmentation, photosensitization and carcinogenesis has rarely been considered.

It has been shown that sunscreens will decrease the incidence of experimentally induced ultraviolet carcinogenesis (12). Therefore, the widespread use of sunscreens might significantly reduce the incidence of skin cancer. Such agents could easily be incorporated in many types of cosmetics, thereby decreasing sunlight accelerated aging and carcinogenesis.

The popular suntan fad is unnecessary and should be condemned. The fair skinned person who wants a tan should not subject his or her skin to the amount of sunlight necessary to produce tanning, and most people who develop a tan easily are already medium to dark skinned and do not need a suntan for cosmetic purposes. Although not proven as of yet, the routine use of a good suntan preparation might allow tanning without predisposing the individual to aging and carcinogenesis.

Photosensitive dermatoses can be produced by visible wave lengths in addition to ultraviolet; therefore, the sun's rays concerned with light sensitivity range from approximately 2900 to 8000 Angstrom units (13). Epstein has emphasized the fact that various disease entities have been provoked by more than one spectral region and are not due to specific wave lengths (14).

The above discussion does not in any way mean that outdoor activities should be decreased or discontinued, even for blondes. It only means that the ill effects of sunshine should be recognized and understood so that harmful exposures can be avoided. Excellent protection can be provided through the proper utilization of clothing and sunscreens.

Since dermatologists are basically interested in protecting patients from the ill effects of sunlight, a sunscreen with a wide absorption spectra would be the agent of choice. The chemicals should not cause primary irritation or produce sensitization, and any formulation should be compounded in a manner that is cosmetically excellent. It would be safe to predict that there will be increased interest in sunscreens and that new uses and application will be forthcoming.

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SPEAKING FROM SPAIN

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Glycerine versatility

IN DEODORANTS... ANTIPERSPIRANTS... MOUTH WASHES EYE LOTIONS...TOILET WATERS...NAIL LACQUER REMOVERS

The extensive range of useful glycerine properties makes it a desirable ingredient for the cosmetic chemist and the pharmacist in many formulations. Its function may depend on the chemical and physical characteristics of the vehicle, or on the softening emollient action it is capable of exercising on the cosmetic film brought into contact with the skin.

Many papers have been published on the cosmetic applications of glycerine[1, 2, 3, 4, 5, 6, 7, 8] the detailed description of which we will omit here. In this article we will attempt to cover only the important and versatile role which glycerine can play in formulations of deodorants–antiperspirants, mouth washes, eye lotions, toilet waters and nail lacquer removers, following mainly the European criterion.

In order to clarify the subject somewhat, we have outlined a formulation scheme on the products to be reviewed, with their usual forms of use, the chief characteristics required, and the typical ingredients (see table, pages 2-3).

advertisement

DEODORANTS – ANTIPERSPIRANTS

Within this line of products, three different presentation forms are popular, in each of which we will examine the functions and advantages of glycerine.

a) Sticks: The high alcohol content of these solidified products, of the type of an alcohol-stearate gel, presents the problem of controlling its easy volatility. This can be achieved in some degree by addition of glycerine, a polyalcohol with very low volatility. Such an addition of glycerine also has a plasticizing action which protects the stick from breakage, and, as a non-volatile solvent, glycerine prevents the settling of sodium stearate to the skin.[9] Another effect, also due to the addition of glycerine, is the maintenance of an adequate degree of transparency of the stick.[10] The moistening effect of glycerine prevents the too rapid drying of the deodorant on the skin, giving to the stick a smooth-touch and favoring its application.[8, 11] It is normally advisable to employ no more than 5% of glycerine, since it may excessively retard the necessary evaporation rate in use, reducing thereby the refreshing effect of the product.

The function of glycerine in controlling the evaporation also prevents the possible crystalization of the astringent salt, which if it were to happen, would create difficult application problems.

Another interesting effect is that glycerine can act as solvent for the gelation agent (or solidification agent), permitting increased concentration. This makes possible an elevation of the melting point of the stick, an important consideration in the warm countries.

b) Creams and Lotions (solid and liquid emulsions): The so-called vanishing creams constitute the type with most widespread acceptance (O/W emulsions). The frequent inclusion of astringent salts and bactericides into such products creates some additional problems, which must be taken into account when formulating said products: in the first place the presence of astringent salts, in many instances characterized by a strong acid hydrolysis, prohibits the use of usual emulsifiers of the soap type (TEA stearate, potassium stearate, etc.) and makes necessary the use of emulsifiers stable to acids (for instance: sorbitan esters and polyoxyethylene sorbitan esters, the acid-stable glyceryl mono-stearate, some anionics, etc.). In the second case, the presence of germicidal agents (especially the phenolic types) produces inactivation phenomena in the presence of nonionic emulsifiers.[12, 13, 14, 15, 16, 17]

In spite of inclusion of astringent salts and germicidal agents, these creams continue to exhibit the usual characteristics and difficulties of the vanishing creams: ease of water evaporation from the external phase of emulsion and consequent drying, consistency alterations, possible shrinkage of product from the walls of the container and sometimes appearance of crusts on the surface of product. These difficulties must be overcome with a moisturizing agent such as glycerine. To quote deNavarre,[21] introduction of glycerine in O/W emulsions gives a better fluidity (especially in liquid emulsions) and plasticity than addition of other humectants, so that glycerine seems to favor formation of O/W emulsions, contrary to propylene glycol, which seems to favor formation of W/O emulsions.[22] As to the influence of glycerine in counteracting the hardening of an O/W emulsion, it has been found[23] that the optimum concentrations are 7.5% for glycerine, 15% for sorbitol and 10-12% for propylene glycol, respectively. About the question of influence of the diverse polyols on viscosity of an emulsion, the opinions are divergent.[2, 18, 21, 23, 24, 25] In our own tests we have found that association and blending of glycerine with equivalent quantities of polyethylene glycol 300 or 400 still improved the plasticizing properties and spreading of a vanishing cream.

Again, the acceptance of glycerine as humectant is shown by the fact, that Wells[8] maintains even that it can act as emulsifying adjutant and improve the stability (especially in O/W emulsions with polyoxyethylene alkyl ethers). It has been mentioned as another function of glycerine, that, if the emulsion breaks or tends to invert, the glycerine favors the phase inversion, maintaining homogeneous and plastic the resulting new film.

A further effect of its moisturizing action,[26] and not the least in importance, is its softening emollient action on the dry skin, extensively proved by the well known work of Blank.[27] Moreover, glycerine has the subsidiary action of preventing the "rolling" due to the poor adhesion of the film to the skin. Pepper[28] also mentions the value of incorporating it into the vanishing creams assigned to cold countries, since it prevents the breaking of the emulsion, thanks to its ability to lower freezing points.

Product	Principal use	Required characteristics
Deodorants-Antiperspirants	Mask or destroy the secretion odour, or prevent it.	Good consistency, ease of spreading, and such form of package that prevents evaporation. Must not grease or soil clothes.
		Ease of spreading, in addition to its specific properties.
Mouth Washes	Oral hygiene, cleaning, refreshing and/or odour masking action.	Ease of use and efficacy.
Eye Lotions	Clean, stimulate, refresh, soften the membranes of the eyes.	Must not irritate, must be stable, neutral pH, isotonic with lachrymal secretion, and clearness.
Toilet Waters and Stick Colognes	Perfume the body.	Ease of use and pleasant appearance.
Nail Lacquer Removers	Dissolve lacquers.	Careful package preventing evaporation. Must not dry the nails too much.

It can be mentioned too[29] that glycerine has been recommended as a solvent for the new bactericide based deodorants (chlorinated phenol derivatives).

As seems apparent from all this, glycerine supplies in a balanced manner all the properties (hygroscopicity, humectant range, viscosity, low viscosity index, good compatibility, low volatility, lack of toxicity, good colour, taste and odour, lack of corrosive action, low freezing point, required by Griffin[18] of ideal humectant agents.

We believe that the selection of glycerine as moistening agent for deodorant-antiperspirant creams and lotions has so been justified.

c) Liquids: Such aqueous or aqueous-alcoholic solutions require addition of glycerine for its moisturizing, emollient action. Its spreading action favours good adhesion and wetting of the skin. Furthermore, when it is included in sufficient quantity, it is able to impart an adequate body to the lotion or to enhance the effects of other thickening agents.

MOUTH WASHES

Inclusion of glycerine in such preparations usually has various missions: it increases vehicle viscosity, exercises a moisturizing action, acts as solvent and diluent for flavoring materials, and gives a sweet flavor permitting sometimes a lower concentration of other sweetening agents. Wells[8] mentions also its utility as "throat conditioner," and its use in lozenges for this purpose is well established.

EYE LOTIONS

Often these lotions simply consist of a physiological sal solution; in other cases 0.5% methyl cellulose solutions are used, which give an inert, viscous colloid of good tolerance not causing allergic reactions. Addition of up to 10% glycerine can be of interest for its isotonic effect and spreading action. It is a constituent of proprietary products for such use.

TOILET WATERS

Introduction of a low percentage of glycerine into toilet waters increases or maintains solubility especially when the product is subject to evaporation.

Another reason for use of glycerine is to retard perfume volatilization, to fix it somewhat, thanks to its solvent properties and low vapour pressure. Moreover, it must be borne in mind that, due to its compatibility, it does not produce any alteration of perfume.

NAIL LACQUER REMOVER

Addition of glycerine to these preparations is indicated by its emollient action, imparting unctuosity without oily character, a very important feature. This lubricating effect partially compensates for the unpleasant dryness of the skin produced by strong solvents, the basis of most of these products.

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Vehicle	Typical components		
Stick, solidified alcohol gel.	solidifying agent 5-10% glycerine 0-5% alcohol, perfume qs.	astringent salts: Al-salts 15-20 (sodium stearate) germicides: G-11 (0.25%), anobial (0.5%), Chlorophyll (0.05%), quaternary ammonium (2.0%)	
Cream O/W vanishing acid type. Also lotions, liquid emulsions.	Oil phase 15-20% typical ingredients germicides	Aqueous phase 85-80% Glycerine 5-15% astringent 15-20% Fabric-damage inhibitor 5-10%	Emulsifier acid-stable nonionic (incompat.)
Liquid, aqueous or aqueous-alcoholic solutions.	germicide agent astringent agent 15-20% glycerine 3-15%		
Aqueous or aqueous alcoholic solutions. Concentrated liquids.	antiseptic and astringent substances glycerine 0-5% flavoring material		
Buffered and isotonic aqueous solutions.	weak antiseptic, astringent agents, vasoconstrictors glycerine 0-10%		
Liquids.	alcohol, perfume, water q.s. glycerine 0-5%		
Stick.	(as for deodorant sticks)		
Solvent blends.	complex mixture solvents 98% glycerine 0-2%		

NOTE: Inclusion of formulations in this series of articles does not constitute a recommendation by G.P.A.—nor warrant that they are free from patent or other legal restrictions.

advertisement

SOOTHING WORDS

...that give sales a lift

"Contains Glycerine" is an appealing phrase to millions of American women. It brings to mind the soothing skin softness produced by Glycerine and Rose Water, Glycerine Soap and other long familiar products. It's an extra that promotes sales on any label . . . indicating high-quality ingredients of assured safety.

Glycerine is thoroughly acceptable and compatible in toilet goods. In addition to its well-known humectant action, it controls body and consistency, lubricates, prevents settling, resists hardening and prolongs product life . . . an unmatched combination of desirable properties.

A group of toilet goods experts discussed "Glycerine in Toilet Goods" at our 1960 Symposium. We'd be pleased to send reprints of their talks. Address your request to the Glycerine Producers' Association, 295 Madison Ave., New York 17, N. Y.

ADVANTAGES THAT COME WITH . . .
Glycerine

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Skin "tanning" preparations

Products combining sunscreen agents with coloring chemical should bear adequate instructions to prevent burning

The numerous liquids, lotions and creams currently advertised as "tanning" preparations contain a chemical called dihydroxyacetone (DHA) as the "tanning" ingredient. DHA is a fermentation product of glycerin. These products are advertised to produce a "tan" in hours (usually three to six) without sun. Some advertising claims that the "tan" produced is even and natural-looking, and implies that the exact shade desired may be obtained through varying the number of applications.

Labeling directions usually recommend three to four applications the first day, permitting the skin to dry between applications; then one application daily thereafter to keep the "tan," or more applications if a "darker tan" is desired.

Some firms are offering products which combine DHA and a sun-screening agent for use in "tanning" with or without sun. It appears to NBBB that not all of these products bear adequate labeling directions to enable users to prevent burning as is claimed in the advertising.

"Tanning" Action of Dihydroxyacetone Not Comparable to Sun

DHA does not "tan" the skin in the same manner that a tan is produced by the action of ultraviolet rays. Ultraviolet oxidizes melanin, the normal skin pigment already present in the skin, and stimulates the production of additional melanin. Surface layers of skin become thickened and it is this thickening of skin, rather than the tan itself, which affords the greatest protection against sunburn. *DHA causes no increase in melanin pigmentation.*

DHA has the property of imparting a temporary color to the skin which is very difficult to remove. The mechanism of action by which it produces color on the skin is not definitely known; however, it has been determined by some sources that certain skin proteins react with DHA. The color resulting from the use of DHA preparations is, in effect, that of a stain which is confined to the outermost skin layer. The color gradually wears off over a period of days as a result of normal shedding of surface skin cells.

The Post Office Department initiated fraud proceedings against one firm (Wonder Drug Corporation, which engaged in mail order advertising of Mantan and Positan, products now advertised by Drug Research Corporation and Positan Corporation respectively) as a result of advertising claims which implied that the preparations produced a physiologic reaction similar to that caused by exposure to the sun's rays. The Complaint was settled by a Stipulation of Agreement which, while not constituting an admission of any of the allegations or that any statute had been violated, provided for certain modifications of the challenged claims in any future mail order advertising.

Coloring Problems

Some users of DHA products have complained to NBBB that the color produced is quite unlike the "even, natural-looking tan" promised in advertising. Some have reported yellow and orange colors; others a blotchy or mottled effect.

There have also been reports of difficulty in applying evenly some of the liquid preparations, with the result that streaking and uneven color results; that the preparations "dye" or stain eyebrows or hair with which they may come in contact. Even when they are applied evenly, some areas of the skin may absorb differently than other areas, thus resulting in different shades of color. According to our information, DHA will stain wool and leather.

The Safety Factor

DHA has been known for many years and has been internally administered primarily as an antidote for cyanide poisoning and in the treatment of insulin shock. Its use in topical preparations as an agent which has a darkening or staining effect on the skin, represents its first external use.

The only data known to NBBB on the safety of DHA for topical application when it was initially marketed were some laboratory tests indicating that it was non-irritating to the skin and eyes of rabbits and guinea pigs. Some clinical use tests with certain DHA preparations, which have been conducted during the past six months, have indicated that they caused no primary irritation on the subjects tested and that in the opinion of the investigating physicians, the sensitizing potential, if existent at all, is exceedingly low. However, the numbers of subjects on which such tests have been conducted have been extremely small and, therefore, inadequate to determine conclusively the safety of products advertised for daily use by millions of persons over an indefinite period of time.

Although no information is currently available

which would indicate that the various "tanning" preparations are not safe for use on normal skin, NBBB believes that *unqualified* claims that such preparations are safe to use should be avoided until such time as they have been proven so in long-term usage, or by extensive clinical tests.

Amount of DHA in Formulations Not the Only Factor Determing Skin Color

The usual amount of DHA in preparations currently on the market is said to range between 2%-5%. However, the amount of DHA in a formulation is not the only factor involved in the degree of skin coloration produced. The intensity of the color produced may vary according to the vehicle in which it is combined. For example, a higher percentage of DHA in one vehicle may or may not produce as much coloration as a lower percentage of DHA in another type of vehicle.

In addition, the type of color produced by any preparation may vary considerably from person to person. Therefore, any firm which proposes to claim that its product is superior by virtue of a higher DHA content than competitive products should be prepared to substantiate such claims with adequate clinical data on the complete formulation.

Labeling Directions for Dihydroxyacetone-Sunscreen Preparations Must Be Adequate if Burning is to be Prevented

Some products which contain both DHA and a sunscreen agent are advertised to "tan" the skin in or out of the sun, and to prevent burning and peeling while in the sun. For example, advertising for one such product has claimed that it "helps you to tan faster in the sun without burning . . . . . *protects* in strongest sun." Yet labeling makes no claims whatever about protection from burning. Directions for use of the product in or out of the sun are practically identical (three or four applications about 20 minutes apart with instructions not to wash off or bathe for about a half hour), the only essential difference being that for use "Without Sun," after the first day, the product is to be applied once daily "to maintain tan."

It appears to NBBB that such directions for use are not adequate to insure that users of the product can develop a suntan "without burning" as is claimed in the advertising. For example, directions say nothing about a need to reapply the preparation during the day, particularly after swimming or if profuse perspiration or friction removes the protective film. Neither are there any instructions or suggestions about length of time for sun exposure, particularly on hot days, until a natural tan (which builds up a natural resistance to the sun's rays by increased pigmentation and progressive thickening of the stratum corneum or outer skin layer) has been developed.

Another product which is unconditionally guaranteed to prevent sunburn carries directions for applying while in the sun only if "superior protection from burning" is desired. The basic directions for use before exposure to the sun are to apply three to four times, allowing 20-30 minutes between applications, with instructions not to wash off for three to four hours.

Although some preparations are formulated in such a manner that the protective film is not removed by swimming, the film is likely to be removed through friction such as rubbing with a towel.

Importance of Reapplication Directions

Chemical sunscreen agents absorb various wave lengths of burning ultraviolet rays to various degrees. A suntan preparation that permits users to develop a natural tan must allow some burning rays to pass to the skin. The skin of individuals varies considerably in sensitivity, thickness, natural pigmentation, etc. The potency of sunlight in producing sunburn also varies greatly with the locality, the altitude above sea level, the time of day, and season of the year. Even under the best conditions, a burn may occur if exposure is sufficiently prolonged, particularly early in the "tanning season." The color of the skin during sun-bathing is not reliable since sunburn is a latent effect. Except in severe burns, reddening does not occur until more than an hour after actual burning.

NBBB thereofre believes that so-called "tanning" preparations containing sunscreen agents for which sunburn prevention claims are made, should be labeled with adequate directions for reapplication during exposure, particularly during the initial exposure of untanned skin to strong sunlight.

Although the reapplication of sunscreen agents is an important precaution in the avoidance of excessive exposure of the burning effects of the sun, it should be noted that NBBB does not know what skin color may result if DHA-sunscreen preparations are applied a sufficient number of times daily over a period of time to prevent burning.

Recommendations to Media

In light of information currently available, NBBB recommends that media consider the following as a basis for determining copy acceptability of so-called "tanning" preparations:

- –that no claim should imply that such preparations "tan" the skin in a manner similar to the action of ultraviolet rays;
- –that no *unqualified* claims of safety be made unless or until adequate use or test data are submitted in substantiation thereof;
- –that advertising should not claim unqualifiedly that the color produced looks like a "natural tan," or that users can obtain the exact shade desired;
- –that *unqualified* claims that DHA products will not stain clothing should not be made unless proof is presented that such is a fact;
- –that products which combine DHA and a sunscreen agent, and for which sunburn prevention claims are made in advertising, should bear adequate labeling directions to enable users to prevent burning;
- –that competitive claims of faster action, most natural-looking color, "deeper" shades, best protection from burning, etc., should not be made unless competent clinical data (on complete formulations, not single ingredients) are available to substantiate such claims.

Organoleptic quality and the stereochemical theory of olfaction

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THOSE persons who have read the literature of olfaction and odor chemistry appreciate that there is a plethora of speculation about the fundamentals and a paucity of critical experimentation. Thompson (1) has advanced cogent arguments against all of the published theories of the "physical" kind. The implication does not follow that "chemical" theories have some vestige of weight as one cannot classify strictly theories which involve both stereochemical aspects as well as electronic ones. The stereochemical theories of olfaction of Amoore (2) and Beets (3) which envision the filling of sites by odoriferous molecules that enter the nasopharynx and impinge upon the organ of smell are such expressions.

Amoore's stimulating hypothesis of reception is similar to Pauling's (4) concept of antibody formation. A submicroscopic site on the receptor is filled by a circumambient odoriferous molecule. When the configuration of the molecule yields a perfect fit in the concavity of the site, there is maximal stimulation. A less than perfect fit could yield a similar, though weaker, perception of quality. Moncrieff (5) was the first author to state that this abstraction "could explain all of the known facts of odour".

Amoore (ibid) made an ambitious survey of 800 odoriferous compounds whose organoleptic qualities had been published largely by organic chemists. He found that 7 descriptive terms—ethereal, camphoraceous, musky, floral, peppermint, pungent and repulsive—occurred a significantly high percentage of times as compared with other terms like lemony, balsamic, and almond. The 7 terms stand for discrete entities or "primaries". By building scale models and studying the structures of 567 compounds, Amoore devised 7 unique submicroscopic sites. However, since his sites reflect the compounds with freely rotating structures as well as rigid configurations, their odor specificity is to be questioned. Freely rotating molecules may vary in shape from a straight chain structure to a virtually spherical one.

Beets (ibid.) expressed the concept of a perfect fit into a site by hypothesizing that the first stage of olfaction is the bringing together of the odorant molecule and the olfactory pigment or receptor cell in such a way that a particularly favorable spatial disposition of a group of atoms, in the molecules concerned, leads to the required contiguity. Beets has elaborated this theory by means of a comprehensive analysis of the synthetic musk structures. He has raised the question: is there only one musky receptor site or are there two or more of them to accommodate the 6 structural types of musks? There may well be a musky site and one or more muscoid sites as it seems unlikely that all of these keys could fit into the same lock! Beets postulated that odor type is contributed to by a minimal overall configuration of the odoriferous molecule while the intensity is effected by steric modifications.

When the fit of a molecule into a given site is less

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Experimental data and practical manufacturing experience of over 100 years' specialization in beeswax and beeswax compounds are at your service without cost or obligation. Write about your beeswax problems to WILL & BAUMER CANDLE CO., INC., Syracuse, N. Y. Est. 1855 *Dept. AP*

Spermaceti—Ceresine—Red Oil—Yellow Beeswax—Composition Waxes—Stearic Acid—Hydistear

than perfect, it may result in the perception of a complex odor; e.g. 2-4 primary qualities from a pure compound. In short, because the molecule makes an imperfect fit, the pure ambient population may affect two, three, or four sites simultaneously. Amoore did not carry his investigation far enough to give a complete analysis of complex odors into their components. However, he thinks that aniseed is the result of integration by the brain of signals originating in the camphoraceous and floral sites. Likewise, lemon is perceived when the camphoraceous, floral, pepperminty, and pungent sites discharge their impulses simultaneously to the cerebral cortex.

In contrast to these stereochemical theories, Mullins (6) investigated humans with an olfactometer and postulated a reception theory of three submicroscopic sites, and a mechanism with different reaction times when molecules impinge upon the olfactory organ, as the criteria for qualitative odor differences interpreted by the brain. This theory suggests an auditory analogue, whereas the stereochemical theories suggest that there are a relatively small number of primaries which may be combined to produce many thousands of complex odors. However, in some instances, these odors no longer seem to have an organoleptic relationship to their parent primaries. Such occurrences are infrequent and probably will have to be assigned to secondaries. The stereochemical viewpoint appears to fit most of the data known about odors and above all is a working hypothesis for the odor chemist. Although defective, it is none-the-less useful for cataloging odoriferous compounds with their immense diversification of molecular structure!

The Survey or Indirect Method

The direct method of investigating an organism for the possible existence of primary submodalities of sensation is by means of a submicroscopic electrode. The method is frequently used with anesthetised small mammals because it is necessary to expose a specific nerve which subserves the modality. The "pick up" electrode, with a tip diameter of 0.5 micron, is applied to a single nerve fiber and an indifferent electrode is applied to another part of the animal's body. If the method were applied to the olfactory organ a pure odoriferous vapor would be flowed over it and certain fibers would become electrically active; e.g. exhibit an all-or-none response, provided that there exists a discrete set of receptors which are stimulated by a given pure stimulus. The evoked impulses would then be transmitted to an oscilloscope by the "pick up" electrode for identification and interpretation.

Beidler (7) tried this direct method on the laboratory rabbit and reported an inconclusive result because it was impossible to apply the electrode to a single olfactory fiber or axon. This type of axon is unmyelinated and has an extremely small diameter. Consequently, the electrode was in contact with a small group of fibers! Since the primary olfactory neurons (which have the receptors at their distal ends) tend to fan out from the cribriform plate towards the neuroepithelium, the technique of teasing a nerve until only one fiber remains intact, as has been done on the taste nerves (8), is obviated. Therefore, the indirect method of performing controlled organoleptic tests on

humans is the only means of investigating the alleged olfactory "primaries" and it entails difficulties.

In the first place, Williams (9) showed that much convincing evidence has been accumulated about the biochemical individuality of humans. The evidence is presented in 7 categories including differences in responses to drugs and chemicals, and differences in blood and body composition. Included among the chemicals are the circumambient odoriferous molecules which have entered the nasopharynx. In each category there are "items for which the differences between 'normal' individuals are not 25 to 50 per cent but actually 500 to 1000 per cent! Even wider variations than these are not infrequent". Therefore, it is not surprising that untrained "normal" people vary markedly in their odor typing and that even somewhat experienced odor judges disagree as to the organoleptic quality of a compound.

The types of Caucasians with varying degrees of body pigmentation suggests that there are different genetic strains. The olfactory receptors contain brownish pigment granules which are related to the amount of other body pigments. The different strains could account for the great variation in regard to odor description. Were it possible to sample a genetically homogeneous subpopulation at least the inter-individual variation of odor typing would be reduced. However, as we are unable to do this, successive screenings for three or four attributes in the random samples is the means of obtaining a uniform corps of judges. This degree of uniformity seems to be as essential as good innate nasal ability.

In the second place, the sense of smell possesses a hedonic value as there are odors which are decidedly pleasant or unpleasant in their affective reactions. Pfaffmann (10) stated that the mere mention of hydrogen sulfide as opposed to jasmin probably elicits stronger hedonic responses in most of us than would the mention of any two colors. Furthermore, the meaning of words has been subjected to quantitative measurement (11) so that it is necessary to find out how the basic olfactory terms may cause individualistic reactions or encoding in relation to the "primary" odors. When terms like fruity, rosaceous, and repulsive are used by several persons during an odor test, there is a probable source of bias that may increase the inter-individual variation. For instance, when a given judge designates a nuance as "repulsive" it does not mean necessarily that he has disagreed with another judge who has perceived this nuance and called it "pungent". Yet one would like to minimize the effects of this class of psychic factors!

Never-the-less, the indirect method of investigation commands our attention because of Amoore's empirical evaluation of organoleptic quality. In order to perform critical tests of his theory, we have employed a homologous pair of pimelic esters (12), and are prepared to use two homologous pairs of lactones (13). The latter are among the few compounds which can be modified at a sterically critical point on the molecule. They have fairly rigid or unchanging configurations thereby conforming to one of Amoore's requirements for the theoretical synthesis of the receptor sites.

Furthermore, experimental use of carefully selected standards of the 7 alleged primaries should lead to a more refined odor language. It has been evident to specialists that ósmics has been handicapped by vague or inadequate terms. Consider the numerous structures which organic chemists have described simply as "musky" in odor. Beets (ibid.) classified them as macrocyclic, steroid, aromatic nitro, indane, tetraline, and benzene musks. Thus, it would seem that similar odors of structurally diversified compounds may require different receptors. However, chemists have often described odors as similar because they associate them with the same natural source or odor complex. The chemist may have overlooked the small qualitative differences in odor that are detectable by trained odor judges in double blind experiments. These differences could have a significant meaning in the final analysis.

Methods and Materials

Odor judges were selected from 97 volunteers who took 45 triangle discrimination tests (14). This screening was exacting and well suited to the requirements of that project. The difference in the qualities of the pimelic esters was small and the desmethyl homologue was evanescent in the two quart brandy glasses, covered by watch glasses, which presented the stimuli. The 45 tests were analyzed by means of Rao's sequential analysis (15), the acceptable minimum being $P = 0.60$, $\alpha = 0.01$. A fee was paid to the judges on the basis of good attendance and number of sessions at which they worked.

The judges' ages ranged from 18 to 24 years. Since people tend to have atrophy of the olfactory nerves as they grow older (16), these students were physiologically adequate. Furthermore, all of these people had been used in a previous experimental project (17) during which they ranked the intensities at saturation of Methyl-4-carbomethoxypimelate and Methyl-4-carbomethoxy-4-methylpimelate.

In order to analyze the organoleptic qualities of test compounds, judges must be trained to identify and remember the primary odors. Standards are selected from Amoore's list of compounds (18) and the general literature. The standards are presented in concentrations obtained by dissolving them in Celluflex CEF (tris β-chorethyl phosphate), which is inodorous when new. Fruity standards were added to the 7 primaries as follows:

Standard	Primary	Per Cent Concentration
ethylene dichloride	(ethereal)	100
geraniol	(floral)	5
phenyl isothiocyanate	(pungent)	1
*amyl mercaptan	(repulsive)	1
camphor gum	(camphoraceous)	100
l-menthol	(pepperminty)	100
**Exaltone	(musky)	100
ethyl malonate	(apple)	50
methyl anthranilate	(grape)	75

*Dissolved in diethyl phthalate by the manufacturer to one per cent.
**Dissolved in plain mineral oil as it was relatively insoluble in Celluflex.

The ethylene dichloride has so great an evaporation rate that it was allowed to diminish from smelling blotters in the atmosphere instead of diluting it with the solvent.

The initial training was done by placing each judge in a cubicle that was flushed constantly with purified air. The standards were presented on smelling blotters, one at a time, for pair comparisons with 19 unknowns. These were various mixtures of pure compounds (19) which the judges were required to analyze into the correct components. Several accessory standards were used because some of the unknowns contained compounds other than the primaries, such as acetic acid, dioxane, or carvone. A given formulation consisted of three or four compounds and the judges' success in identifying the organoleptic qualities was graded. This was based upon the number of compounds in a mixture. Twelve persons were accepted and their grades indicated a learning gain with increasing experience. Ability to analyze three primary qualities in a pure compound with constant dependability evolved as the limit of precision for subsequent experiments.

Three men and 5 women were selected from the 12 who were trained to use the primary standards for the first experiment with a pair of original olfactometers (Fig. 1).

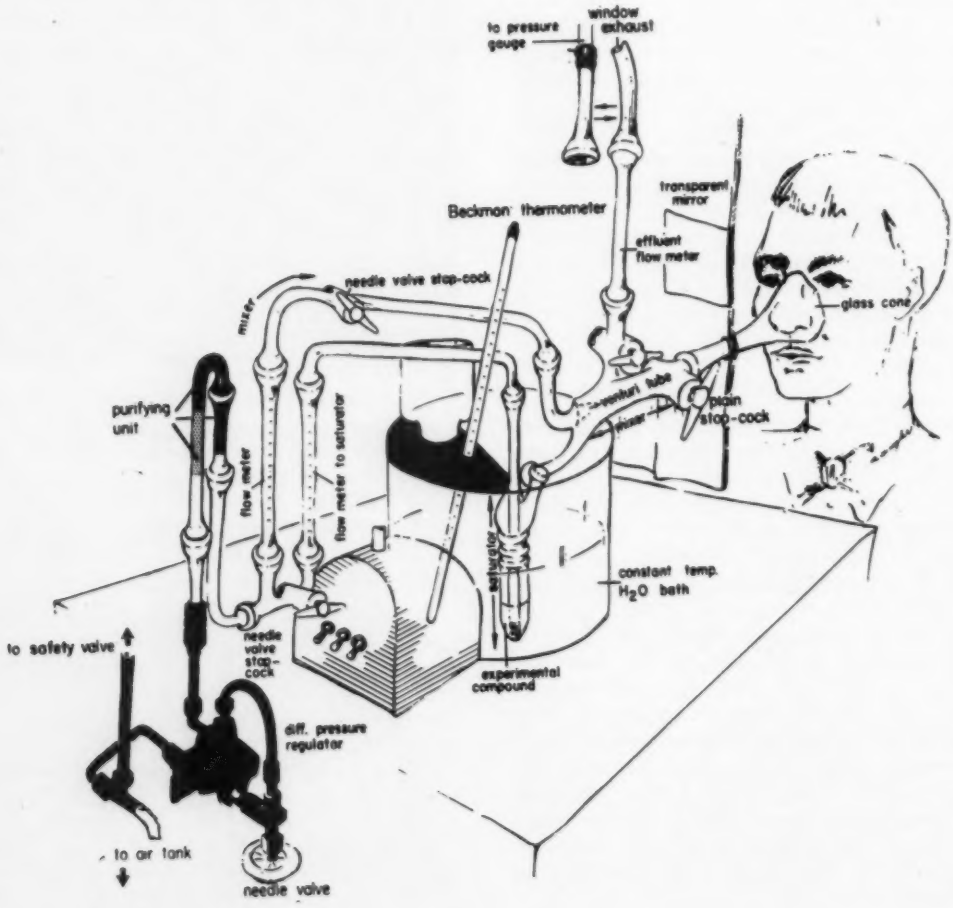

Figure 1—OLFACTOMETER. Two glass instruments are mounted 6 inches apart with their saturators partially immersed in the constant temperature water bath at 25°. Purified breathing air is conducted from a cylinder to a differential pressure regulator and thence through a purifying unit containing activated carbon and granular silica gel. The air stream divides and the desired flow is metered to the satuator, where the air bubbles from a coarse glass filter through the liquid phase of the experimental compound. The saturated air is then conducted to the mixer where it is diluted by pure air from the line passing directly to the mixer. The air enters through a Venturi tube which expedites mixing with the saturated air. The resulting stimulus is directed upward through the effluent flow meter and then to a window exhaust most of the time. During this resting interval, total flowrate is determined by the effluent meter. When a test is made, the pair of teflon stopcocks are reset and the stimulus flows to a glass nose cone, for a brief interval, on the other side of an opaque curtain. The odor judge inhales quietly, refraining from forcible sniffing, and exhales the stimulus from the mouth into the room. The transparent mirror enables the experimenter to observe the judge without the latter being able to watch the manipulation of the olfactometers. When saturated airflow is desired for the stimulus all of the purified air is directed into the saturator so that dilution cannot take place in the mixer.

A Pilot Experiment

Two batches of Methyl-carbomethoxypimelate, at least a year and a half apart in age, were presented to the judges for description of the organoleptic quality. Amoore had predicted on the basis of the ester's structure and his theory, that it would have ethereal, floral, and faint minty components which yield a pear aroma.

The vapor pressure of the compound was determined as 2.14×10^{-4}mmHg at 25°C by means of the Knudsen Cell method (20). The per cent of saturated air flow delivered by the olfactometers ranged from 0.34 per cent to 100 per cent, the stimuli being maintained at 25°C ± 0.01. Purified air flowed through the instruments at 0.5, 1.0, or 1.5 liters per minute.

The judges found the quality complex at all recognizable intensities and flowrate was found to affect the judgments significantly. The pooled data is shown in Table I. Chi square tests, validated by significant t values (21), show that odor-typing differs very significantly between the judges at the weak and moderate intensities, but that there is agreement at strong intensities.

Table I

Judgments of Organoleptic Quality by 8 Judges (1959 Batch of Methyl-carbomethoxpimelate)

	Number of Judgments					
Quality	weak stimulus	%*	moderate stimulus	%*	strong stimulus	%*
grape	5	8	16	22	9	31
bland fruity	14	23	14	19	5	17
floral	16	27	16	22	3	10
pungent	11	18	13	18	4	14
ethereal	1	2	3	4	0	0
musty	7	12	11	15	7	24
dusty	6	10	0	0	1	4
total	60	100	73	100	29	100

*Per cent of total judgments.

1. Pooled judgments of 8 judges selected for the experiment with Organoleptic Qualities × 3 Classes of Stimulus Concentration, both batches of the desmethyl pimelic ester pooled: Chi Square = 108.039, d.f. = 42, $P < .005$, N = 94; t = 8.169 according to the normal distribution.

2. 1959 batch with pooled judgments of 7 judges and Organoleptic Qualities plus Essentially Inodorous Categories × 3 Classes of Stimulus Concentration: Chi Square = 116.63, d.f. = 88, $P < .05 > .01$, N = 167; t = 2.066 according to the normal distribution.

One expects to find greater inter-individual variation at the weak and moderate intensities and so pooling the data was necessary because of these differences. Pooling resulted in more than three components of quality, but the infrequent ones are probably due to random human errors.

At concentration levels of 0.34 to 33.0 per cent, the judges sometimes perceived a faint bland fruitiness, while from 41 to 50 per cent the odor was bland fruity-pungent (and verging on floral as compared with methyl anthranilate). From 85 to 100 per cent there was a definite bland odor resembling methyl anthranilate with pungent and musty nuances.

A judge is required to remember the standards while working at the olfactometers because the presence of dipped smelling blotters would contaminate the atmosphere of the odor laboratory. Consequently, the judges need frequent practice between sessions in order to reinforce odor memory and thereby decrease guessing.

Therefore, three of the most experienced judges were given intensive practice with smelling blotters for 8 sessions. Many complex odor qualities were added to the primaries as well as 8 hitherto unused musky compounds in order to increase the ability to identify nuances. These judges were then assigned to a new olfactometric experiment with instructions to request further practice on the basic standards whenever they felt the need of it.

A Critical Experiment

Batches of Methyl-carbomethoxypimelate and Methyl-4-carbomethoxy-4-pimelate were tested for homogeneity in a Pye Argon Chromatograph (22). The chromatograms showed that the respective batches were similar. Then pair comparisons were made of the odors of the pimelates. This was to test Amoore's prediction that the substitution of a methyl group for a single hydrogen at a sterically critical point on the molecule would yield a weak ethereal odor in contrast to a fruity odor for the parent compound.

The vapor pressure of the gamma methyl homologue was found to be 2.26×10^{-4}mmHg at 25° (slightly higher than the desmethyl pimelate). Four vapor concentrations were presented to the judges at one total flowrate of purified air. The intensities were 4.00, 33.0, 67.0 and 100 per cent of saturated air flow. The flowrate was 1.82 liters per minute. The compounds were changed occasionally from one olfactometer to the other after deodorizing both instruments. These conditions were withheld from the three judges and there were a total of 13 sessions per judge.

The 4 concentrations of the stimulus affected the judgments of organoleptic quality of both esters. A Chi Square test of the desmethyl homologue, d.f. = 9, gave $X^2 = 66.76$, $P < .005$, N = 177, while a test of the gamma methyl homologue, d.f. = 15, gave $X^2 = 61.70$, $P < .005$, N = 196. Consequently, the judgments at 67 and 100 per cent of saturated air flow were pooled for analysis because of better perceptions. One of the categories stipulated was a miscellaneous grouping of a few odd judgments that may have been random human errors.

There were 47 judgments for the desmethyl compound and 42 for the gamma methyl homologue. Table II presents the frequencies and per cent of total judgments under "critical exp.". Similar values for the "pilot exp." are included for comparison with the desmethyl pimelic ester. Note that the critical experiment showed that the parent compound was fruity with a repulsive nuance and the gamma methyl homologue was fruity with an ethereal nuance. The earlier pilot experiment showed the parent compound to have fruitiness and a pungent nuance. The difference of judgment of the nuance of the desmethyl homologue may be attributed to confusion over the standards of pungent and repulsive. When a pair comparison of the compounds was made at 100°C by the experimenter (J.W.J.), using

smelling blotters, the desmethyl compound had a decided fruitiness which was rather sweet. The gamma methyl homologue had a bland floral verging on fruity and an ethereal nuance. It was only slightly sweet and seemed a nondescript odor in contrast to the parent compound.

Table II

Pooled Judgments for Pilot and Critical Experiments Compared Moderate and Strong Stimulus Classes Pooled

	Pimelic Esters					
	Desmethyl				Gamma methyl	
Organoleptic Quality	Pilot Exp. judgments	%*	Critical Exp. judgments	%*	Critical Exp. judgments	%*
fruity	41	47	26	55	22	52
floral	7	8	2	4	3	7
pungent	28	32	2	4	3	7
ethereal	3	3	0	0	5	12
repulsive	0	0	6	13	0	0
miscellaneous	9	10	11	24	9	22
total	88	100	47	100	42	100

*Per cent of total judgments.

In weighing Amoore's predictions of organoleptic quality against these results, the blandness due to low vapor pressures at ambient temperature must be given consideration. In the olfactometers, turbulence in the liquid phase at the flow rates employed may have been too great to yield the degree of saturation necessary to perceive these odors well. It is recalled that during a previous experiment with a static method of presenting saturated air, a significantly large number of judges agreed that there was a clear difference between the organoleptic qualities.

However, the present experiment revealed the approximate recognition thresholds of the judges for these compounds. The values in per cent of saturated air flow are as follows:

	Per cent concentration Pimelic Esters	
Judge	Desmethyl	Gamma methyl
41	5 – 33	5 – 33⁻
45	33 – 67	5 – 33⁻
50	33±	33+ – 67

The values show the differences between individuals with regard to sensitivity, and the relatively high vapor concentrations necessary for nasal analysis.

Current Judge Selection

As the goals of the next two projects will require highly competent organoleptic descriptions and fine discriminations of pepperminty and musky compounds, the latest screening of tyros and method of training the accepted ones is directed toward their retention of standards for the olfactometric experiments. Several tests are necessary to determine the select few among a group of 50 volunteers. The tests are a sequence of steps, each testing or describing a given parameter. The first is the ability to state the number of odoriferous components in unknowns with pair comparisons. The second is the ability to recall the primary odor terms or qualities when smelling the primary standards in a double blind situation. The third is a test of sensitivity to the standards because some people cannot perceive well certain primaries at all concentrations. Hence, throughout the stepwise testing a multifaceted measure of intra- and inter-individual variation is being obtained. This measure will show whether the training and practice are narrowing the range of variation and also helping to eliminate guesses of minor components or nuances in "complex" odors.

The initial screening consisted of three half hour sessions with two unknowns per session in the odorless cubicle. Some unknowns were gleaned from the previous training while others were new formulations based upon current analyses by the experienced judges of a variety of odoriferous compounds. An example follows:

Number 35

*8 level spn., Versalide
2 drops, amyl mercaptan (1 per cent solution)
2 drops, acetic acid
20 drops, ethylene dichloride
176 drops, Celluflex
200 drops, total

*The solids were measured with a Coors Number 1 porcelain spoon (A. H. Thomas Company).

The number of standards presented was greater, of course, than the actual number of components in the unknowns.

The tests were easy enough for inexperienced college students between the ages of 17 and 22 years. The volunteers were not asked to identify the compounds per se, but rather to determine the number of standards present.

The criterion of acceptance was the average for the junior college group. Since this subpopulation had the least amount of science education, their average served as a means of evaluating the subpopulations from the Nursing and Dental Schools. They were then taught to recognize the primary standards and to use basic odor terms. The average scores of the three subsamples are presented in Table III (cf. Screening Scores). It should be noted that the scores of the groups are very close. (The experienced judges do not appear in the screening results, since they had been screened previously by a different method.)

Table III

Selection of Judges

Subsample	Screening* Scores	Retention Scores Mean %	Range %
Junior College	2.67	80.76	76.6 – 84.4
Nursing freshmen	2.45	76.24	53.2 – 93.8
Dental freshmen	2.66	89.55	83.3 – 97.0
Experienced judges		70.40	54.2 – 81.6

*The minimum acceptable individual score was 3.61 on the basis of 1.00 as a perfect score.

By way of training, the 16 tyros were given 4 practice sessions during which the correct sniffing technique was explained. The standards were presented on smelling blotters to groups of three or four

persons, and the similarities and contrasts in organoleptic qualities were discussed. A few complex odors were smelled, also, in order to let everyone appreciate nuances.

The next step was a double blind experiment to determine how well the judges retained the standards and understood the basic terms. A total of 21 persons were tested including 5 experienced judges.

Eight unknowns were presented on smelling blotters to 5 or 6 judges at a time.

The unknowns were:	Per cent concentration
ethylene dichloride	10
geraniol	5
phenyl isothiocyanate	5
d,l-menthone	0.5
d,l-menthone	5
ethyl malonate	10
camphor gum	100
Exaltone	100

A different code was assigned to the unknowns before each of 4 sessions by an assistant so that even the experimenter was unaware of their identities. Such randomization was used to prevent systematic bias. Each judge was given a dipped smelling blotter which he discarded as soon as the judgment of organoleptic quality was noted on his report. A list of odor terms was provided at each session from which the participants could select in expressing their odor descriptions.

Each judgment was graded on the basis of Amoore's postulate that the primaries have one organoleptic quality at ambient temperature. Thus, if the coded ethylene dichloride was described as ethereal, the judgment received a rating of one. If this standard was described as repulsive, it was rated zero. On the other hand, if the coded phenyl isothicyanate was described as pungent > floral, it was rated 0.50, since the correct quality was the stronger component, etc.

The average grades of the 4 subsamples and the ranges are given in Table III under "retention scores". The four men from the Dental School achieved the best result while the 5 experienced judges had the poorest per cent average. This seems to have been due, in part, to over analysis as they were accustomed to working with quite complex odors. Furthermore, the retention scores do not seem to correlate with the initial screening scores, so that both attributes seem to be distinct and, hence, essential for the appraisal of judges.

This experiment served, also, as a practical way of evaluating the standards. When a majority experienced great difficulty with a standard, it was reviewed. Consequently, ethylene dichloride and phenyl isothiocyanate have been replaced by easier compounds as they were erroneously described a significant number of times. Ethanol (absolute) is being tried as the ethereal standard and acetic acid as the pungent one. Lastly, it appears that all of the judges will require frequent practice at discriminating between camphoraceous and pepperminty because of confusion between the two.

Discussion

The results of the static method employing saturated air at 25° ± 1 had proved conclusively that there is a difference of organoleptic quality between the pimelic esters. Nineteen qualified judges have taken 45 triangle discrimination tests. Out of a total of 855 such tests, 764 were successful. The judges must have been largely dependent upon differences of quality for correct identification of the odd unknown as judgments of intensity rank showed them approximately equal. It follows that the difference is primarily one of quality rather than intensity.

Furthermore, the predominant odor components of these esters at 100°C were not identical as the parent compound was a rich fruity while the gamma methyl homologue was bland floral verging on fruitiness with an ethereal nuance. The indication of a weak ethereal component was especially interesting in view of the prediction that methyl substitution would change the odor from fruity to weak ethereal.

In contrast to the above static experiments, the results of the dynamic method (olfactometry) showed that Methyl-4-carbomethoxypimelate is fruity and that it has a pungent minor component or a repulsive nuance while the Methyl-4-carbomethoxy-methyl-4-pimelate is fruity with an ethereal nuance. The different results stemming from the two methods, static vs. dynamic, may be attributed to weak intensities obtained by the latter method. The presence of an ethereal nuance in the methyl derivative tends to uphold Amoore's prediction that the difference between the two will be determined by an ethereal component. However, the ethereal component observed is quite weak and this critical test of the theory is not as conclusive as it could be. Were the odors of these compounds more intense, a more definitive judgment of the theory could be stated. This consideration sets the stage for the other critical experiment with the lactones, devised by Dr. Martin Rubin of Georgetown University Hospital, that possess definite odor power.

In relation to these compounds, Amoore has predicted that the lactone of 4-butyl-4-hydroxycyclohexanecarboxylic acid should have fair pepperminty, weak camphoraceous, and fair floral components that would yield an almond odor. He stated, further, that methyl substitution at the one position of the cyclohexane ring, giving the lactone of 1-methyl-4-butyl-4-hydroxycyclohexanecarboxylic acid, would eliminate the pepperminty component. This homologue should have a weak floral quality approximating to resinous.

Contingent benefits have accrued from these experiments with the stereochemical theory. Outstanding standards of practical value have resulted from the testing of odoriferous compounds that could epitomize Amoore's "primary" qualities. Mr. Harry C. Saunders, Givaudan-Delawanna Corporation, made cogent suggestions as a result of his comprehension of the implications of the theory. These led to the adoption of Exaltone and phenylethyl methylethyl carbinol as standards of musky and floral, respectively. His view that "pure" organoleptic quality involves a perfect fit in one of the submicroscopic sites

led to the fitting of molecular scale models of theoretically promising compounds into sites that were modelled to precise scale in sculptor's plastiline. This technique yielded impressions of the degree of perfection of fit and the realization that many of the pepperminty compounds listed by Amoore have too loose a fit. The concept of "perfect fit" will have to wait until specific modifications can be arrived at from competent organoleptic descriptions of those molecules with basic structures. Published odor descriptions are frequently too vague to permit specific structure-odor correlations.

The selection of useful standards was aided by evaluation of the odor power of some odoriferous compounds. This work has been directed primarily toward a new experiment for training and evaluating the novices among the odor judges. It is the third systematic test that is aimed at measuring intra-individual variation while providing personalized training of the judges for the olfactometry. Results of the evaluation, thus far, have shown the importance of frequent practice on the 8 primary standards in order to have good judges.

Olfactometry is the only known technique of conducting critical odor experiments. It controls the intensity of the stimulus as well as the odor purity. While the judge is inhaling the stimulus, his nose is isolated from the room air and possible interaction with trace odors even though precautions are taken to control adulterants. The olfactometer, unlike the olfactorium and smelling blotter, can produce many precise dilutions of the saturated air flow. This facility is important to the scientific apraisal of odors as we need to determine whether increasing dilutions will alter the organoleptic quality of a compound or merely reduce its odor power. Needless to say, though, investigations of this type are difficult with substances that have little odor power; e.g. pimelates.

Challenges of this sort are leading to improved methods of training and testing human beings for olfactory investigation whose practical applications will extend beyond the aforementioned theoretical goals.

Summary

J. E. Amoore's concept of the stereochemical specificities of the human olfactory receptors was subjected to intensive experimentation utilizing trained odor judges.

The little known esters, methyl-4-carbomethoxypimelate and methyl-4-carbomethoxy-4-methylpimelate, were used to test a prediction of the organoleptic qualities by means of olfactometry.

The parent compound was judged to have a fruity major component and a pungent minor one by a group of judges; and a fruity major component and a repulsive nuance by another group. The difference between the two experiments may be due to difficult nasal analysis at weak intensities.

The gamma methyl homologue was judged to have a fruity major component and an ethereal nuance by the same group who perceived the repulsive nuance in the desmethyl pimelate.

The presence of an ethereal nuance tends to uphold Amoore's prediction that substitution of a methyl group for the hydrogen atom at the fourth position on the central carbon atom would add an ethereal component to the odor of the parent compound.

Two homologous pairs of lactones with definite odors will be presented to trained judges by means of a pair of olfactometers. Thus, another critical test will be made of the stereochemical theory that should yield specific organoleptic descriptions.

Amoore predicted that the Lactone of 4-butyl-4-hydroxycyclohexanecarboxylic acid should have fair pepperminty, weak camphoraceous, and fair floral components that would yield an almond odor. The gamma methyl homologue, Lactone of 1-methyl-4-butyl-4-hydroxycyclohexanecarboxylic acid, should lack the pepperminty component and smell a weak floral quality approximating to resinous.

New methods of training and testing human beings for critical olfactory experimentation are being developed and the early results are reported.

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The new package

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The Schering Company came to us, a manufacturer of plastics, in January of 1957, to develop for them a squeeze package consisting of a bottle, cap, and a plug which would dispense their liquid by the drop. At this stage, we were not aware that it was planned that this package would be filled and assembled on a completely automatic and asceptic piece of equipment. The project actually was defined as two packages, one to contain 5 cc of product and the other 15cc, each utlizing common plugs and caps. The plug was to be designed to dispense a liquid containing a crystalline suspension, a drop at a time, without squirting or clogging. A special screw cap was to be designed and an aluminum seal was to make the assembly tamper-proof. Schering knew that they had undertaken an unusual package requiring exceptional dimensional control and insisted from the outset on quality tooling and manufacturing control and were willing to pay a premium to get it.

Throughout the project, the basic requirements of the package remained fairly constant even though particular details were altered. Before we were able to start on product design, we made contact with a manufacturer of aluminum seals to determine the limitations of producing a tamper-proof seal. With rough limitations received, we proceeded with preliminary design. It had first been thought that a standard 15mm-415, or tall finish, should be used, but the skirt on the aluminum seal could not economically be drawn to the length that would be needed. It was decided then that we would utilize a single turn of engagement between the cap and bottle-threads. It might be noted, at this point, that most plastic bottles on the market having a 15mm finish make use of the 415 thread series which allows two turns of thread engagement. Since this size finish has 12 threads per inch it results in a normally weak thread form in plastic. The stock phenolic and urea caps on the market today were originally designed to mate with glass bottles and considerable clearance was allowed to compensate for the wide range of tolerances needed in the manufacture of glass containers. When these caps were fitted to plastic bottles, it was found there was a tendency to strip the cap during capping but more thread engagement minimized this action. Knowing this history, we designed the fit between the bottle neck and cap with a minimum of clearance and with special buttress thread forms not employed in glass packages.

The Schering Sales Department originally liked a bottle of oval design but their production department on the other hand, being very practical, wanted a round design for ease of handling. A compromise was finally reached and it was determined to design a bottle being essentially an oval having vertically fluted end panels. The thought here was that the bottles would push each other down a conveyor belt without jamming as many ovals do. It might be mentioned, at this point, that the initial design spanned a period of about five months and it wasn't until several months had gone by that we were fully aware of the completely automatic operation being considered.

During the design period, many discussions were

held concerning wall thickness versus permeation rate, and dimensions and tolerances of the mating areas were negotiated one by one. Schering asked that the bottle be produced free of chips or contamination and we considered this to be no problem, since the bottles were to be manufactured by a process which forms the interior and exterior of the neck complete in the machine with no need for any reaming or trimming operation. It was also required that the plug be seated in the bottle neck with a mechanical lock to prevent its popping out when pressure was exerted for dispensing. The bottle was designed with an undercut bead at the mouth of the neck, and the plug with an undercut on its shank to accept this bead.

The undercut bead serves another important function in providing a primary seal on the plug shank by means of a line contact. Our company advocates this method of sealing in preference to the friction fit or surface contact seal because the small bead compresses and conforms more readily to the surface of the plug. A secondary seal is made by means of a seal bead on the underside of the plug flange which is pressed against the top of the bottle neck by the cap.

The basic exterior shape of the plug had been standardized previously and had been designed for completely automatic handling. We had had previous experience with controlled dispensing of a liquid using a design which employed a long narrow passageway to restrict the flow of liquid. Since the Schering liquid contained a crystalline material, it was found that our stock plug would not work due to a clogging effect. We knew from this experience that we were faced with the problem of molding a plug with a very tiny orifice and having an inner construction which would prevent jetting of liquid.

The design of the cap offered no problem since this was a known art. A liner is not required since an adequate primary seal is effected by means of a line contact with the tip end of the plug. A secondary seal is made by means of a shoulder in the cap seating on the flange of the plug.

When product design approval was given, we were authorized to construct sample tooling and produce 1000 sets of parts. After parts had been made and submitted for approval, eight months went by until we were again contacted by Schering for release of production tooling. During this period, we continued development work on the dispensing action of the plug. Many designs were tried and discarded until we hit upon one that gave excellent results and production tooling was planned on this basis. At this point, we learned the proposed packages would ultimately be used for a variety of products and that our plug must work satisfactorily with each of them. It turned out that these products were of different viscosities and contained various percentages of crystalline substances. Needless to say, this completely upset our plans, and we had to do a great deal of basic research work to find a design which looked good on paper, as well as, in samples. No less than three partial sets of production tooling were made before one was found which would hold up in auto-

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matic molding. I believe any good molder will understand the problems involved in producing an orifice of about .008 in diameter at the end of a hole approximately 13/32 deep.

At the time production tooling was released further discussions were held and several changes were made in the package including an increase in bottle wall thickness and a re-shaping of the cap to accommodate the assembly of the aluminum seal.

The cap mold went into production smoothly and required only an adjustment to minimize the length of gate mark.

After the production bottle molds had been sampled, Schering decided to eliminate the vertical flutting and we attempted this by re-machining the cavities. We were unsuccessful because of the difficulty of machining a canted parting line dictated by the original fluted design. New blow molds were made but when samples from these new molds were run in the assembly machine, a jamming in the feed chutes resulted and the cause was an approximate .005 mismatch of the bottom push-up. It was also discovered, during this period, that because of the particular shape of the bottle and its extremely heavy wall section that some dimensions exhibited normal shrinkage but others would shrink and then after 48 hours would increase in size larger than their respective mold dimensions. This is a phenomenon seen occasionally in injection moldings and is caused by orientation stresses introduced by the flow patterns. To relieve these stresses a molding shrinks along the lines of material flow and the geometry of the piece sometimes results in a bulging at some point.

We all believe the major difficulties encountered in developing this package are now behind us and the problems henceforth will be those of the production department in maintaining the quality required.

Conclusion

All of us who have been associated in the creation of this package have benefited greatly from our experiences and have a fuller realization of the complexities of modern packaging. There were many lessons to be learned, some of which can be passed on to others.

To automatically handle the various components comprising a package, it is necessary to manufacture them within very tight dimensional limits and rejects must be practically nil to prevent machine stoppages. This requires a re-education of the personnel involved in fabrication of tooling, as well as those in the production and quality control departments. This cannot be emphasized strongly enough since all of the beautiful plans and drawings made on paper will never come to life unless the man at the machine understands the need for quality. Those defects normally acceptable by normal commercial requirements cannot be tolerated under an automatic set-up.

At the inception of a new package, it is essential that the principle or automatic assembly be declared if the components are so to be handled. Each supplier must be fully aware of this and it would be wise, at this point, to call a joint meeting of all suppliers and to discuss in detail each component and operation for complete understanding. Each supplier must think in terms of the complete unit rather than the particular component or operation for which he had contracted. There has been a reluctance on the part of many buyers to bring his suppliers together, but we found in the development of this package, that our lack of understanding the other fellow's problems allowed us to overlook those small details which can so easily upset a complex program. It would be wise for each of the principals to assign a co-ordinator in his company through whom all informtaion would flow. It is difficult for any one person to be an expert in all phases of manufacture, therefore, the co-ordinator's prime responsibility is to see that the information is directed into the proper channels, and to see that the proper people are brought together to solve the problems expeditiously as they arise.

We are not all aware of it, but upon reflection, it can be seen that a revolution in packaging has been in the making for the past few years and automation is becoming a reality to fulfill the need for mass production. To quote Henry Ford "Mass production is the focusing upon a manufacturing operation of seven different principles: power, accuracy, economy, continuity, system, speed, and repetition". It will be possible to process plastics packages automatically at higher speeds as compared to glass because of better dimensional control and freedom from breakage. Until recently, the molding of plastics into various forms has been thought of as an art but it is now becoming an exacting science. Molding shops have been given more uniform formulations of plastics by the manufacturers of the raw materials and are now able to choose from a wide variety of formulations for the one having the properties best suited to the application. The molding equipment and accessories now on the market allow the molder better control of the molding process and give freedom in the design of more automatic molds.

Because of progressive automation, specifications in the packaging industry are being tightened and controlled by rigid quality control departments. These departments are now making the quality decisions previously made by the packaging engineer. Unfortunately, not all of the recruits for these departments have had previous experience with plastics and are setting up A.Q.L. levels which are impractical. There is a running battle going on now between quality control personnel and plastics processors, which I am sure must result in compromises on both sides. A purchasing agent can help if he will accept the responsibility of informing a potential supplier of the quality levels against which a particular items will be purchased. As these levels are raised, manufacturing costs increase and the purchasing agent must decide if his own specifications and quality control departments are setting unreasonable quality levels. Often a preliminary discussion with the supplier, at this point, can result in a reduction in packaging costs.

In closing, let us recognize that we are all in an expanding industry which demands the best thinking our technical minds can provide, and we can only meet this challenge by working together and having faith in each other's abilities.

PACKAGING & PROMOTION

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3

1—Revlon

Revlon is marketing nationally a purse-size hair spray in the three formulations which have been available in large-size metal aerosols for home use. These "Living Curl" preparations are for normal, hard-to-hold hair, and tinted or bleached hair. Two-color lithography over the white base coat differs in color according to the type of product formulation. These gold capped containers retail at $1.00 each. Promotion of the new products is being backed-up by network TV and national magazine color advertising.

2—Lesli Laboratories

Lesli Laboratories has introduced a home facial kit which combines four products intended to give women a do-it-yourself, professional facial. Two types of kits, one for women 16 and over, and the other for women over 25, are being promoted. The products in both kits are safe for sensitive skin.

Television, magazines and newspapers will be used to promote the kits and the advertising will use a clear, smooth facial reflection surrounded by a stippling effect, giving a subliminal comparison of poor skin to beautiful skin. Market-by-market penetration through distribution in drug, cosmetic and department stores, as well as beauty salons, is being planned for these items.

3—Rexall

Rexall has brought out a new hair controller for men which is being merchandised as effective for control of butch, crew and regular cuts. The individual display unit of "Mr. Groom" has a free comb attached and the deal retails for 59 cents. The glass jar with a screw top closure carrys brand and product identity in blue and white. The product is available in Rexall stores throughout the United States.

4—Yardley of London

"Fair and Clear" is the name of a new anti-blemish cream by Yardley of London, Inc. The product is packaged in a stand-up collapsible metal tube with a special rigid plastic cap. Approximately the same shape tube has been used by Yardley in its foreign marketing of an anti-blemish cream. The U.S. package

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incorporates three-color lithography over a white base, while the foreign tube is paper covered.

The anti-blemish cream is being marketed for minor skin blemishes in persons of all ages but will be sold primarily to the 15 to 21 group in which such blemishes are particularly virulent.

5—Helena Rubinstein

Helena Rubinstein has introduced a new product in her "Tree of Life" line which is being promoted to soothe and lubricate dry, flaky skin through an oil applied to bath water. Called a beauty bath for dry skin, the product is packed in 4 and 8 ounce bottles and packaged in the gold and white Tree of Life box. The four ounce size will retail for $3; the eight ounce size for $5 plus tax.

6—Shulton

Old Spice Pro/Electric Shave Lotion is being marketed by Shulton, Inc. to eliminate electric razor drag, to prevent razor over-heating and to condition the skin. An extensive advertising campaign for this product in men's and general interest magazines during the summer and fall months will be augmented by a college newspaper campaign during the fall semester. The Pro/Electric box departs from the regular Old Spice carton but retains the Old Spice red with white logo for identification with the balance of the line on retail shelves and counters.

7—Coty

Coty, Inc. has introduced "Dermacare" Medicated Treatment Kit for pimples, acne and blackheads. The kit contains a medicated night lotion, medicated make-up cream and medicated foam wash. As an introductory offer the kit will sell for $2.95 instead of the regular $3.75 price. A free consumer booklet "Talk about teen-troubled skin" is included with each kit. Magazine and television advertising is planned to reach both consumers and the medical and nursing professions.

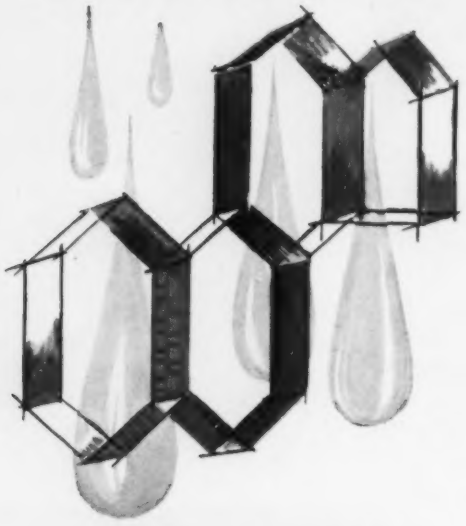
7

8—Nutress

Nutress Laboratories has brought out their Creme Hair Protenizer in a polyethylene tube. The two-ounce container is made of milk white poly and printed in black and red. An elongated, nose with a white overcap completes the package. This product is now available only to professional beauticians but will soon be introduced to the retail field.

8

for Penetration



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TECHNICAL ABSTRACTS

Percutaneous Absorption of Capric Acid Diethylamine.

Capric acid diethylamine (Cap.) was found to penetrate the human skin. The absorption quota, identified through urine determinations is, in proportion with the amount applied and the contact area, a maximal 0.3%. The toxicity varies according to the species of experimental animal investigated. Long-term clinical laboratory studies performed in human beings, comprising the blood count, sedimentation rate, serum electrophoresis, Takata Ara reaction and determination of the serum lactic acid dehydrogenase as an indicator of hepatic damage, showed no deviation from normal values. The absorption quota was comparatively low. The a.m. findings are completed by clinical observations. The amount of Cap., however, found in the urine does not constitute an exact indicator of general absorption. This is in accordance with the present concept on the absorption of substances subjects to biochemical transformation. *Thru Arzneimittel-Forschung, March, 1960, p. 204. By Von G. Stuttgen and A. Mollenbeck.*

German 1,080,387: Powdered Beverage Extracts—e.g. of coffee, tea, etc. production by a continuous cold vacuum extraction process, Kolle, G. et alia. 21.6.57 as 53d. 3. K32237.

Pulverized condiments, beverages, drugs, etc. are produced by a continuous cold vacuum extraction process in which the ground starting material, e.g. roast and coffee beans, tea, drugs, etc., is extracted with small amounts of a liquid and the extract so obtained is extracted further in a circulating extractor. The particle size of the final product is pref. 2-10 mu. A suitable apparatus is described with drawings. *Thru Organic Patents Bulletin, May 27, 1960, Gp. 5—p. 10.*

German 835,927: Germicidal Articles Treated With Silver Thiocyanate. Permachen Corp. 12.3.57 as 8149/57.

It has been found that silver thiocyanate, in contrast to other silver salts, is not photosensitive, so that articles treated with it have the bactericidal properties of articles treated with other silver salts and retain their initial colour even after exposure to sunlight. Silver thiocyanate may be precipitated in situ on the article or an aqs. medium contng. a binder and a precipitate of silver thiocyanate may be applied. Pref. soln. for treatment is an aqs. soln. of silver thiocyanate and a colourless water-soluble thiocyanate. In an Example, an aqs. dispersion contng. 470 p.p.m. of Ag SCN and 1% of a commercial resin emulsion was padded on white knit cotton cloth. There was no discolouration after exposure to sunlight for 16 hrs. Tests for bactericidal resistance were satisfactory against e.g. M. pyogenes, E. Coli and B. Subtilis. *Thru Organic Patents Bulletin, May 27, 1960, Gp. 5—p. 16.*

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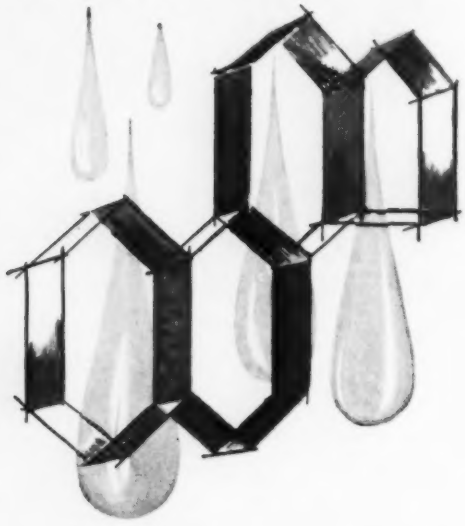

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Pharmacological Investigations of the Drug Panax Ginseng C. C. Mey.

The experimental pharmacological analysis of three new preparations of *Ginseng* roots showed that its marked influence on the integrative nervous activity is the most important part of its effect. Experimental and clinical investigations performed by the author proved that *Panax Ginseng* has a general stimulating effect on the integrative nervous activity and will increase stimulation—as well as inhibition processes of the cortex of the cerebral hemispheres. Simultaneously the application of *Panax Ginseng*, an especially effective stimulant, was observed to induce the syndrome of protective inhibition in some cases, owing to the typological peculiarities and the functional state of the nervous system of some individuals. An important advantage of *Panax Ginseng* as a stimulant of the cerebral cortex compared with phenyl-alkylamines is its cholinominetic action. A series of other investigations showed further properties of the tested *Ginseng* preparations: they possess marked hypotonic action on blood-pressure which will be only slightly influenced by bilateral vagotomy, but is abruptly inhibited following application of atropine in the experimental animal: they possess stimulating effects on respiration, show moderate anti-narcotic action, they will regulate the carbohydrate metabolism in experimentally induced hyperglycemic states, they potentiate the hypoglycemic effect of insulin, show hypoglycemic action themselves in higher doses, will increase weight in experimental animals, induce increase of the number of erythrocytes and the amount of hemoglobin, i.c. According to the opinion of the author, the physiological base of this complicated pharmacodynamic action of the *Ginseng* preparations tested is their effect on the nervous reflex mechanisms: primarily they stimulate processes in the cerebral cortex, but furthermore the cholino-reactive systems as well. *Thru Arzneimittel-Forschung, May, 1959, p. 310-311. By Von Wesselin Petkov.*

The Stability of Oily Cream B.P., E. W. Clark and G. F. Kitchen, from Westbrook Lanolin Company, Argonaut Works, Laisterdyke, Bradford, 4, received December 1, 1959

Oxidation of Wool Alcohols B.P. in stored Oily Cream B. P. is insignificant and does not affect the stability of the cream, but the method of preparation, and the amount of autoxidation in the wool alcohols used in making the cream, do affect stability. Storage of wool alcohols before use, as a mixture with Liquid Paraffin B.P. or Liquid Lanolin "60" (a solvent segregation product of Anydrous Lanolin) greatly reduces autoxidation. Liquid Lanolin "60" also acts as an auxiliary emulsifier and imparts stability. Modifications to the official method of preparation are suggested. *Thru J. Pharm. Pharmacol. 12, 4, 227 (1960).*

Effects of Volatile Oils. Phytodynamic Effect of Volatile Oils by L. Barbalic (Pharmazeutische Fakultat, Zagreb, Jugoslavia.

The pharmaco-dynamic effect of the volatile oils is well known today. In comparison the phytodynamic effect of the volatile oils is less well known. This effect has been tested only for a very limited number of different volatile oils and with superficial and insufficient tests. The volatile oils represent in general the most important effective materials of aromatic plants. Since such plants are often found in nature they have an important part in the composition of vegetation of a region. For this reason it was decided to do research on the possibilities of their phytodynamic effects. Based on the results it was reported that the applied volatile oils hinder some life phenomenon of the test plants. *Thru Am. J. Hosp. Pharmacy, 17, 311 (1960).*

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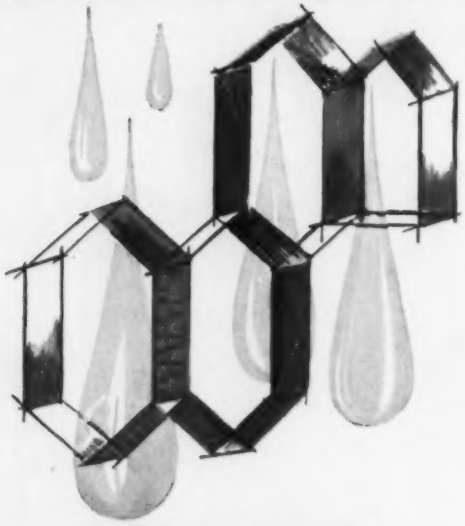

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Oral Toxicities of Lauric and Certain Lauric Acid Derivatives, O. Garth Fitzhugh, Paul J. Schouboe, and Arthur A. Nelson

"Subacute toxicity data for lauric acid and sorbitan monclaurate (Span 20) and chronic toxicity data for lauric acid glycerides (S-1062) and polyoxyethylene-20 monolaurate (G-2129) in rats have been presented. Sorbitan monolaurate tested at 25, 20, and 15% levels for 23 weeks caused significant growth depression beginning at the lowest dietary level and significant increase in mortality at the 25% level. There was progressive enlargement of the common bile duct with each increase in dosage, and gangrene of the tail at all feeding levels, with a greater number of rats affected at the 25% dosage. Histologically, liver damage was pronounced and lung changes were present. Polyoxethylene-20 monolaurate tested at 25, 10, 5, and 2% levels for two years caused growth retardation in male rats at the 25% level. Mortality data showed no significant differences from the controls. There was a progressive increase in incidence of liver cysts and distention of the cecum as the dosage increased. Feeding of lauric acid glycerides at 25% of the diet for two years caused only minor histological changes in the liver. In a group of 5 rats, not microscopically examined, feeding of lauric acid at 10% of the diet for 18 weeks had no deleterious effect." *Thru Toxicology and Applied Pharmacology, 2, 1, 66(1960).*

The Physics of Tablet Compression X, Mechanism of Action and Evaluation of Tablet Lubricants, W. A. Strickland, Jr., Takeru Higuchi, and L. W. Busse

A study of theoretical aspects of tablet lubrication has been carried out in an attempt to elucidate the mechanism of lubricant action and the relationships that exist between chemical structure and lubricating properties. The results of this study indicate that the mechanism of lubricant action, as described for other systems, may be applicable to tablet lubrication. Thus, lubricants may generally be divided into two groups; the first known as fluid- (or hydrodynamic) type which is exemplified by hydrocarbons and the second, termed boundary-type lubricants such as the metallic stearate salts. There appears to be correlation between chemical structure and lubricant efficiency in the tablet-die wall system. The effectiveness of fluid-type lubricants appears to be related to the viscosity of the material used. In this system paraffin was more effective than liquid mineral oil. The evaluation of other classes of compounds revealed that metallic salts of fatty acids were generally the best lubricants while fatty acids, fatty alcohols, alkyl sulfonates, fatty amides, and certain polyvinyl and polyethylene glycol derivatives exhibited good lubricating properties. However, silicone resins, inorganic salts, proteins, carbohydrates, and many metal oxides displayed no lubricating properties. Included in the paper are the results of a survey in which 70 materials were evaluated as tablet lubricants. *Thru J. Am. Pharm. Assoc., 49, 1, p. 35, 1960. Scientific Edition.*

New Types of Fatty Substances as Ointment Bases In Pharmaceuticals. A. W. Awe (Inst. for Pharmaceutical Tech., of the Tech. Inst., Brunswick). Fette Seifen Anstrichmittel 61, 978-85 (1959).

The author gives a short survey of the application of new types of fatty substances and ointment bases for the pharmaceutical industry in the light of the third supplement of the German Pharmacopoeia. The possibilities of processing of new types of ointment bases are discussed and summarized in tabular form. *Thru J. Am. Oil Chemists' Soc., 37, 201 (1960).*

Mechanismus Und Norm Der Thermischen Wirkung Verschiedener Emulsionstypen Auf Der Haut, Prof. Dr. Heinz-Egon Kleine-Natrop

"In the last ten years interest has again been concentrating upon the physical effects accompanying the external application of pharmaceutical preparations in the local treatment of the skin. These activities–which resume the classical chemotherapeutical tradition established by Unna –have been stimulated particularly by the increasing knowledge about the physiology of the skin surface–and this physiology, beside pharmacology, is the starting point of a rational local treatment with pharmaceutical preparations. Attention has always been devoted to the thermal effects accompanying certain types of such preparations, in particular water/oil and oil/water emulsions. If an emulsion of room temperature is applied to the skin–whose temperature is normally higher–there is at first some temperature exchange connected with a short-time reduction of the skin temperature. This effect is comparatively independent of the type of emulsion and may be modified by pre-cooling or pre-heating the preparation in question. This exchange is followed by the proper thermo-effect. With water/oil emulsions containing no active principles, this effect is characterized by temperature elevation, while oil/water emulsions afford a temperature decrease. The different effects due to the two types of emulsion may be explained by the fact that the temperature elevation normally connected with the application of the coating is offset by better thermal conductivity and by the heat consumed in evaporation; for some time there may even be a complete reversal. This effect is more lasting than the exchange effect and on the average vanishes only after about 30 minutes. If suitable graphical and statistical schemes are chosen to compare the temperatures observed after application of the emulsion with those of the free skin it is seen that the temperatures observed remain within the normal range of dispersion of the normal skin temperature; however, this region is narrowed by water/oil emulsion in favour of the higher, by oil/water emulsions in favour of the lower temperatures." *Thru Parfumerie and Kosmetik, 41 Jahrgang, 3, March 1960, page 102.*

Brit. Pat. 825,906. 23.12.1959. "Skin Preparations." Midland Silicones, Ltd., London.

Describes new skin preparation containing siloxanes. Such compositions are said to be suitable for application to the skin and capable of protecting the skin from the deleterious effects of water, hydrocarbons solvents and irritants. Such preparations contain a minimum of 0.5 per cent by weight of a siloxane polymer or co-polymer together with other ingredients used in skin preparations. *Thru Soap, Perfumery, & Cosmetics, May, 1960, p. 492.*

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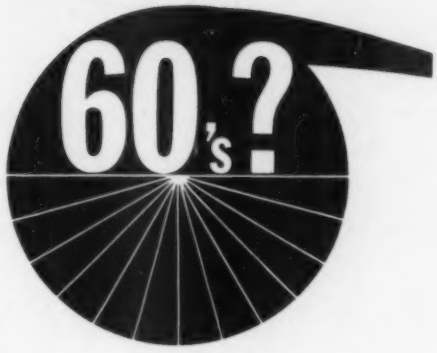

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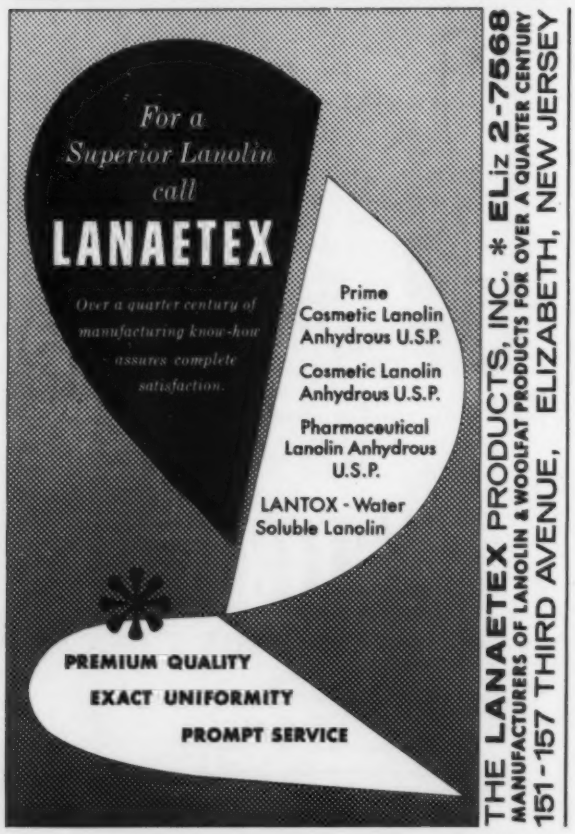
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10-Hydroxy-2-Decenoic Acid in the Honeybee. R. K. Callow, N. C. Johnston and J. Simpson (Nat. Inst. for Medical Research, Mill Hill, London). *Experientia*, 15, 421-22 (1959).

The mandibular glands of the worker honeybee was shown to contain 10-hydroxy-2-decenoic acid. It was assumed that these contain 10-hydroxy-2-decenoic acid. It was assumed that these glands were the source of the acid in the honeybee worker and the queen bee. The acid was isolated by separation with paper chromatography using a reversed phase system. The paper was soaked in a 30% kerosine/aqueous n-propanol system and portioned between ethanol and light petroleum ether. The acid was identified by X-ray powder photographs and infrared spectra. *Thru J. Am. Oil Chemists' Soc., 37, 201 (1960).*

Testing for Purity, and the Assay of Sodium Lauryl (Dodecyl) Sulphate. II., P. Schaller (Pharm.-chem. Abt der Pharm. Inst. der ETH, Zurich). Pharm. Acta Helv., 1959, 34 (5-6), 229-240

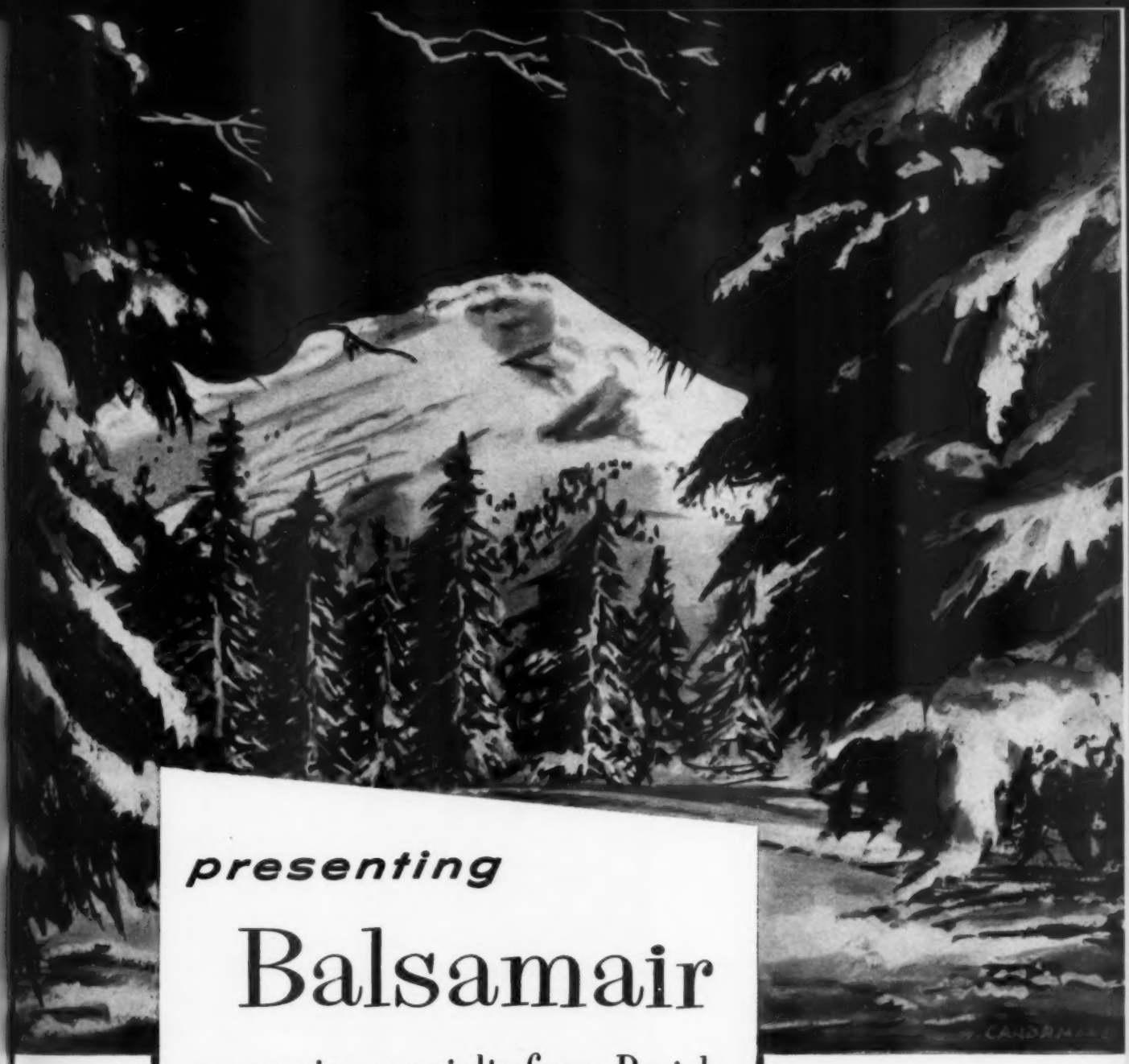
To determine sodium lauryl sulphate in ointments, dissolve the sample in water, or dissolve it in diethyl ether–dioxan (1:1) and extract with water, and apply in modified p-toluidine method (cf. Wickbold, Fette u. Seif., 1952, 54, 394) to the aq. phase. Other alkyl sulphates and aliphatic and aromatic amines interfere. *Thru Analytical Abstracts, 7, No. 2,728 (1960).*

Water-Soluble Cellulose Derivatives, Uses as Primary Emulsifying Agents, Part II, R. E. M. Davies and J. M. Rowson, from the Museum of the Pharmaceutical Society of Great Britain 17, Bloomsbury Square, W.C.1, received November 16, 1959

A study has been made of the effects of heat, acid and alkali, salts and alcohol on the stability of methyl-, methylethyl- and sodium carboxymethyl-cellulose emulsions of liquid paraffin. All were stable for 4 to 8 weeks at 40°, but at 80° deteriorated rapidly, the order of decreasing stability being methyl-, methylethyl- and sodium carboxymethylcellulose emulsions. Heating at 115° for 30 minutes decreased the stability of sodium carboxymethylcellulose, but not of methyl- and methylethyl-cellulose emulsions. Stability in the presence of added substances depended largely on the physical properties of the reaction products. The results are related to the behaviour under similar conditions of aqueous dispersions of the three derivatives, and the influence on emulsion stability of dehydration and degradation of the emulsifying agent is discussed. *Thru J. Pharm. Pharmacol. 12, 4, 237(1960).*

German 1,080,735: Ointment Base—comprising glycerin, a fatty alcohol and a fatty alcohol sulphate. Snoek Fabrik chemischer Produkte o H G., G. 21.12.55 as 30h. 9/04.-S46797.

An ointment base for pharmaceutical and cosmetic use consists of high viscosity organic cpds. with alcoholic OH-gps. attached to aliphatic carbon chains, a higher fatty alcohol contng. at least 14 C atoms in the mol. and a higher fatty alcohol sulphate. The ointment base comprises an almost non-aqs. mixture of about 90% by wt. of glycerin, about 9% by wt. of the higher fatty alcohol and about 1% wt. of the fatty alcohol sulphate. The fatty alcohol sulphate pref. contains 14-22 C atoms and more pref. both the fatty alcohol and the fatty alcohol sulphate have the same no. of C atoms in the molecule. The ointment base may be prepared by heating the ingredients together at a temp. not below 60°, and not above 95°C. *Thru Organic Patents Bulletin, June 10, 1960, Gp. 5–p. 7.*



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. . NEWS AND EVENTS . . . NEWS AND

Perfumery course at Rutgers Newark Extension Center

A two year evening program at the Rutgers Newark Extension Center in the chemistry and compounding of perfumery has been announced.

Beginning this fall the new program will feature lectures and laboratory courses in perfumery and essential oils during the first year, and lectures and laboratory sessions in advanced perfumery during the second year.

Requirements for the course include college chemistry and for those who do not meet this requirement a one semester course in the chemistry of perfume materials is scheduled for the fall.

The first year's subjects in the new perfume series cover the various natural perfumery raw materials, including their application, identification, origin, and availability, as well as synthetic chemicals, including their availability, cost, adulteration and contamination.

Steffen Arotander, noted European perfumer who is now with International Flavors and Fragrances, Inc., will instruct the perfume classes.

The advance perfumery course in the second year will continue the study of perfumery as related to chemistry. This course will be useful to individuals who want advanced training in identification, compounding and manufacture of natural and synthetic aromatics.

The Rutgers program, which is unique in this country, has aroused considerable interest in New Jersey which does a 125 million dollar annual perfumery and essential oil business. Industry in the state has contributed money, materials and personnel in support of this project at the Newark Extension Center.

Detailed information about the single courses or the two year program may be secured by writing Newark Extension Center, Rutgers—The State University, 601 Broad Street, Newark 2, New Jersey.

TGA golf trophy winners

The 10th annual toilet goods industry golf tournament was held in conjunction with the TGA convention on June 28th in Poland Springs, Maine. Trophy winners were Fred W. Webster, International Flavors & Fragrances, Inc. awarded The Cecil Smith Memorial Golf Trophy; Charles A. Pennock, Parfums Ciro, Inc. winner of The B. M. Douglas Memorial Golf

Fred Wirsig, chief chemist for McConnon & Company, Winona, Minnesota, discusses the progress of a class project with three chemistry majors at the College of St. Teresa, Winona. The girls have been doing basic research in the development of a number of the company's new beauty aid products.

College students work with McConnon & Company

Feminine chemistry majors at the College of St. Teresa, Winona, Minnesota are on the staff of McConnon & Company, manufacturing chemists, Winona, as an "extra curricular" activity that gives them academic credit and a chance to work on practical research problems.

Directed by Sister M. Loyola, head of St. Teresa's chemistry department, the students have been doing fundamental research on cosmetics bases.

The chief chemist at McConnon & Company, Fred Wirsig, acts as advisor to the class and the company has provided the department with a new homogenizer to facilitate the work.

Products of McConnon & Company which the young ladies have had a hand in developing include a suntan lotion, a new hand cream, a shampoo and an all-purpose beauty lotion.

Working from basic formulas, the girls mix up small samples, making modifications to suit the needs of the company. Other students at St. Teresa have become expert perfume sniffers and cosmetics testers, according to Sister Loyola.

Both the college and the chemical manufacturing firm are enthusiastic about the results of the program. Richard G. Vickery, vice president of McConnon & Company, has expressed great satisfaction with the success of the cooperative effort and says it has encouraged plans to initiate similar programs in two other colleges in the city of Winona.

Trophy; G. Peter Danco, Ansbacher-Siegle Corporation, recipient of The B. E. Levy Memorial Golf Trophy and Carleton C. Dilatush, Armstrong Cork Company, winner of The Maple Leaf Trophy. George E. Davidson of Art Decorating Company, won first gross.

Bourjois sales and profits up

Bourjois, Inc. has announced a substantial increase in sales and profits for the fiscal year ended April 30, 1960. Net sales were up 10.6% and net profits after income taxes were up 9.6% to $522,860.

New manager for Canadian operations of Lehn & Fink

E. Munro Ashkanase has moved from marketing manager, Lehn & Fink (Canada) Ltd. to become general manager of all Canadian operations. These also include Dorothy Gray (Canada) Ltd. and Tussy Cosmetics Ltd.

Allied to build new plant in New Jersey

Allied Chemical's General Chemical Division has announced plans to build a large, new plant at Elizabeth, New Jersey to produce its "Genetron" line of refrigerants and aerosol propellants. To be erected on a site at the company's present Elizabeth Works, the plant will be the third Genetron facility. The other plants are in Baton Rouge, La. and Danville, Ill.

CISA elects new officers

New officers of the Cosmetic Industry Service Association, elected at the group's last meeting, are Mimi Baillif, president, Jill Jessee, vice president, Ruth Fox, treasurer, Aase Arnessen, corresponding secretary, Genevieve Campis, recording secretary and Ronnie Mazur, director.

New quarters for Polarome

Polarome Manufacturing Company has purchased a building at 3 York Street, New York City, 13, for its offices and those of the Polarome International Company division.

Canadian Association elects officers

Gordon C. Savage, executive vice president of the J. B. Williams Co. (Canada) Ltd., has been elected president of the Toilet Goods Manufacturers' Association, Canada. Other officers are: J. M. Shaw, Toronto, first vice president; K. J. Eccles, Montreal, second vice president, F. R. McBrien, Toronto, third vice president; E. A. Phillips, Montreal, honorary treasurer; George M. Thomson, Toronto, honorary secretary.

Obituary

Samuel W. Menefee, Jr., 53, manager of package development and merchandising, Packaging Materials Division, Armstrong Cork Company, died of a heart attack on July 17th.

The Elizabeth, New Jersey plant of International Flavors & Fragrances, Inc. has been awarded third prize in the Safety Award Contest, Chemical Section, conducted by the National Safety Council. Shown admiring the Award plaque are Joseph I. Brennan, personnel manager, IFF, Edwin M. Hall, plant superintendent, Elizabeth Flavor Division IFF, and Albert S. Paul, production manager, Elizabeth Flavor Division, IFF. Mr. Brennan reports that this division had a perfect record with no lost-time accidents during 1959.

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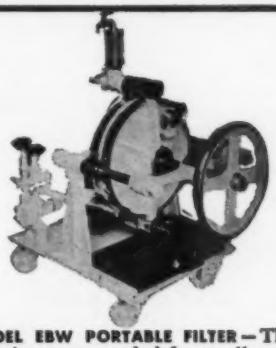

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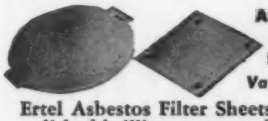

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Helena Rubinstein, Inc. introduces medicated product line

The development of an organic sulphide, a significant drug discovery to combat acne pimples, has been announced by Helena Rubinstein, Inc. This organic sulphide, known as Dibenzothiphene or Diphenylenesulfide is the basic active ingredient of the company's new Bio-Clear Medicated X Cream, the cornerstone of a new line of medicated products.

Dibenzothiphene was first tested clinically approximately seven years ago at a leading German university. At this university, 5 percent of this ingredient in a cream base was used on over 200 cases of various forms of acne. The reported results, in nearly 85 percent of the cases, were considered excellent. These cases were treated for considerable periods of time and "before and after" pictures of many of them were taken.

The choice of this organic sulfide as the active ingredient by the university was based on:

a. The assumption that this ingredient produced a eukeratoplastic result as opposed to the rather drastic peeling associated with stronger keratolytic compounds such as resorcin, salicylic acid currently in use in other acne preparations.
b. Many of the cases treated showed improvement after only four weeks of treatment. In certain cases, it demonstrated healed acne lesions in only 15 days.

Testing and development of a formulation which was both medically and cosmetically acceptable started in the Helena Rubinstein, Inc. laboratories three years ago. This company has now a patent pending covering the therapeutic use of dibenzothiophene on skin.

Aerosol packaging contest announced

The ninth annual aerosol package awards contest, conducted by the Aerosol Division of the Chemical Specialties Manufacturers Association, is now open for entries. Contest blanks have been mailed to all known marketers and fillers, but entry blanks are still available from CSMA Headquarters, 50 E. 41st Street, New York 17, New York. Entries are open to any aerosol brand owners or marketers and are not restricted to members of the CSMA.

Announcement of winners in each of fifteen categories will be made at the annual meeting of the CSMA in Hollywood, Florida, December 5-8. Closing date for entries is October 15th and products submitted must be on the market and have been freely offered for sale prior to September 1st.

Hair color restorer distributed by Consolidated Royal Chemical

Exclusive sales and distribution rights for Canute Water has been obtained by Consolidated Royal Chemical Corp. of Chicago. The product is manufactured by the Canute Co., Santa Barbara, California.

Bob Kunkleman, (at the extreme left) named "Man of the Year" at the Bourjois, Inc., annual sales meeting in Atlantic City, receives an award from Mr. F. X. Patrey, president of the firm. Russ Oliva (at the extreme right) receives a plaque for "Outstanding Achievement" from Mr. G. A. O'Reilly, vice president-sales.

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Hueper to speak at New York SCC

The first speaker of the fall program of the New York Chapter of the Society of Cosmetic Chemists will be Dr. Wilhelm C. Hueper, of the National Cancer Institute. His topic will be "Potential cancer hazards from cosmetics to producers and consumers." Dr. Hueper, chief of the Environmental Cancer Section, is the recent recipient of the Rosenthal Award for his study of the causes of cancer in man.

The Chapter has announced a new meeting place for its monthly dinner and lectures, the Hotel George Washington, Lexington Avenue and 23rd Street. As heretofore, these meetings will be held on the first Wednesday of the month, starting on September 7, 1960.

The remaining meetings in 1960 will be on October 5th with Dr. Steven Jellinek as speaker, and on November 2nd, the annual President's Night.

Officers and directors elected at Fritzsche

Fritzsche Bros. elected the following directors at its annual meeting of stockholders held recently at the company's New York headquarters: John L. Cassullo, Ernest Guenther, Frederick H. Leonhardt, Jr., William H. Mathers and Ellis F. Merkl.

Officers elected at the board of directors meeting were: John L. Cassullo, president, Frederick H. Leonhardt, Jr., vice president, Ernest Guenther, vice president, Edward E. Langenau, vice president, Lidcay Herrera, vice president for export operations, Julius P. Bauer, vice president, Ellis F. Merkl, secretary and treasurer, A. H. Hemminger, assistant secretary and E. C. D'Andrea, assistant treasurer.

Travelers

Louis Bezard, president of De Laire, Inc., recently returned from a six-week trip to Europe accompanied by his wife. In France, Mr. Bezard conferred with the directors and staff of the parent company in Issy les Moulineaux concerning the newest perfumes and specialties of Fabriques de Laire which will be introduced on the American market.

Mr. Kenneth G. Voorhees, Sr., president of Ungerer & Company, has returned from a seven-week European trip in which he and Ivon Budd, 1st vice president and Kenneth G. Voorhees, Jr. visited important accounts and investigated the possibility of expanding the company's overseas operations.

McKesson obtains half-interest in Colombian drug firm

McKesson & Robbins, Inc. is negotiating with Droguerias Aliadas, S. A. for the purchase of a half-interest in that firm's enterprises in Colombia and Latin America. Operations of the firm include Laboratorio Uribe Angel (LUA), one of the largest proprietary drug plants in South America; Laboratorio Cup, the largest pharmaceutical drug manufacturer in Colombia; the Max Factor cosmetic plant in Bogota; and, jointly with McKesson, Calox International in Ecuador, Panama and Colombia.

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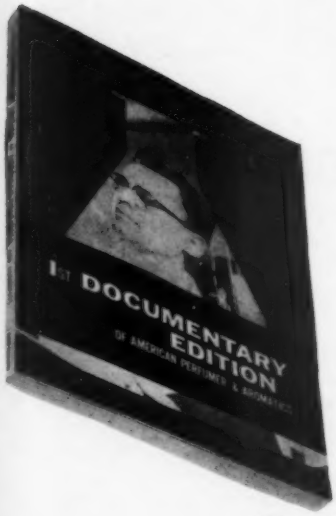

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PERSONALITIES

R. Marshall Quina has been appointed manager of procurement for Newport Industries Company, a division of Heyden Newport Chemical Corporation.

Marie McMurray has been advanced to the position of promotional materials manager of Yardley of London. Mrs. McMurray joined Yardley nine months ago as assistant to the merchandising manager.

James F. Ackley and John R. Carr have been named brand managers of The Toni Company. Mr. Ackley was formerly an account executive with Grey Advertising in New York City and Mr. Carr was with Quality Bakers of America directing advertising and promotion activities.

Edward K. Shukur

Edward K. Shukur will fill the newly-created position of director of products management of the Products Division of Helene Curtis Industries, Inc. Mr. Shukur held the positions of product manager and product group supervisor at Helene Curtis prior to his present appointment.

Christopher H. Buckley has been named vice president and director of sales and marketing for Knox Glass, Inc. He was formerly general manager of the Aluminum Container Division of Kaiser Aluminum and Chemical Corp.

Louis Brennesholtz

Louis Brennesholtz will fill the newly-created position of vice president in charge of production of Yardley of London, Inc. Mr. Brennesholtz, who joined the firm 13 years ago as purchasing agent, was elected to the board of directors in January and was formerly manager of operations.

Edward B. Twombly, Jr. is now vice president in charge of sales of M. W. Parsons-Plymouth, Inc., manufacturers of metallic stearates and fatty acid esters.

Stanley T. Narus has joined the Mennen Company as consumer analyst with the market research department. Mr. Narus was formerly with Colgate-Palmolive Company.

Eugene Di Scala has been named art director—packaging at Shulton, Inc. Mr. Di Scala will be in charge of packaging design for the company's domestic and international divisions. He joined Shulton in 1957 as an artist.

C. H. Shields, Jr. has been appointed manager of the market research and development department of Heyden Newport Chemical Corporation. Mr. Shields has been supervisor of new product development, responsible for co-ordinating all activities relating to initial marketing of new products.

George H. Lesch was named chief executive officer of Colgate-Palmolive Company. He succeeds Edward H. Little, chairman of the board who retired from the post of chief executive officer.

Other appointments at Colgate include: Paul J. Anderson to plant manager, Toilet Articles Division, Jersey City plant; Robert L. Ehrlich to plant manager, Household Products Division, Kansas City plant; Philip Ouellette to the scientific staff of the Pharmaceutical Laboratories Division; Edward Eigen to the Oral Health Research Laboratories and Stewart Karp to the analytical chemistry section of the Corporate Research and Development Department.

J. M. Posternak, M.D.

J. M. Posternak, M.D., has been appointed to direct the new toxicological and pharmacological research laboratories of Firmenich, Inc., in Geneva, Switzerland.

Professor Posternak is head of the Department of Physiology, Faculty of Medicine, University of Geneva. He completed his post-doctorate studies at the University of Pennsylvania and recently returned from an appointment as visiting scientist at the National Institute of Health in Bethesda, Maryland.

Harris Sobol has been named national syndicate store manager for Lanolin Plus. Mr. Sobol joined the firm in early 1959.

David Gutterson has joined LP Laboratories, Chicago, as general manager and advertising director. Mr. Gutterson was previously employed by Lanolin Plus, Inc. as divisional sales manager.

C. Lee Huyck, Professor of industrial pharmacy at the St. Louis College of Pharmacy since 1952, has been appointed senior information scientist at Norwich Pharmacal Co., Eaton Laboratories.

William S. Rhoads

William S. Rhoads has been appointed sales manager of the newly-formed industrial chemicals division of Stepan Chemical Company.

John J. Paredes has been advanced to the position of midwest regional sales manager of Geigy Industrial Chemicals. Mr. Paredes will move to Chicago headquarters from St. Louis where he has been field sales representative since joining Geigy in January 1959.

E. C. Slaght, Jr. has been named technical director and assistant to the president of Newport Industries Company, a division of Heyden Newport Chemical Corporation.

Julius P. Bauer

Julius P. Bauer, newly elected vice president of Fritzsche Brothers, has been made director of the perfume division of that company. **Robert E. Brown,** who will work directly under Mr. Bauer, has been made director of the perfume laboratories.

Robert E. Brown

Michael L. Duggan

Michael L. Duggan is now the eastern regional sales manager for the Lady Esther Division of Chemway Corporation. Mr. Duggan has been product manager of the Household Products Division.

Kenneth W. Hartley

Kenneth W. Hartley has been named vice president and sales manager of Dodge & Olcott, Inc. Mr. Hartley has been a member of the sales staff since 1949 and in 1951 assumed management of the Chicago branch office.

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John A. Scharwath

John A. Scharwath has been appointed sales promotion manager for the Fine Chemicals Division of Shulton, Inc. Prior to joining the company, Mr. Scharwath was consumer merchandising and marketing specialist for United States Rubber Company.

John J. Thompson, vice president of Dodge & Olcott of Canada, Ltd., was elected as associate director of the Toilet Goods Manufacturers Association of Canada for the year 1960-61.

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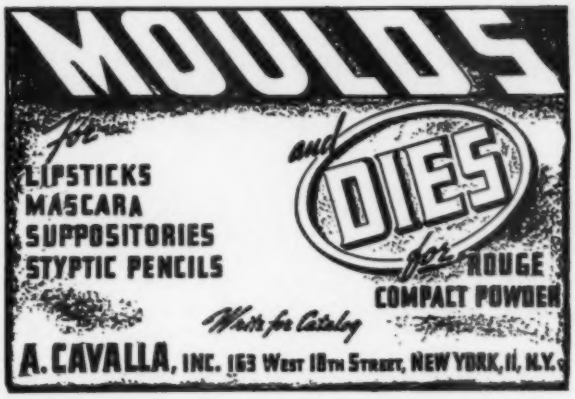

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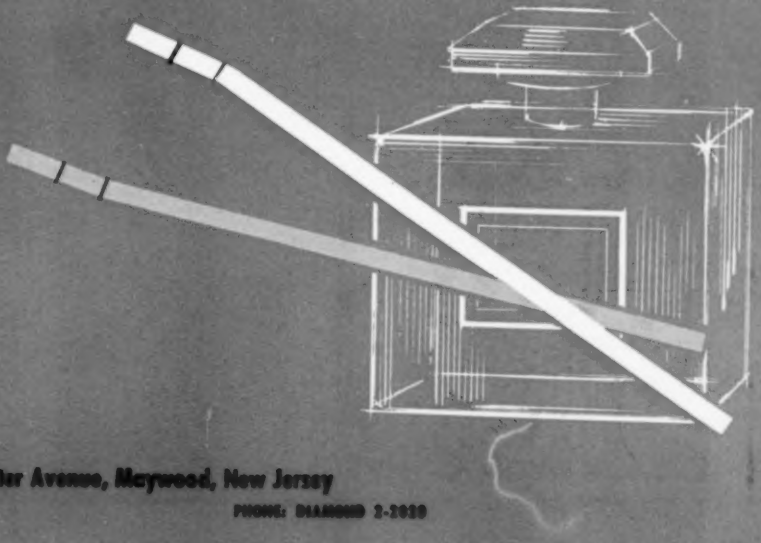

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